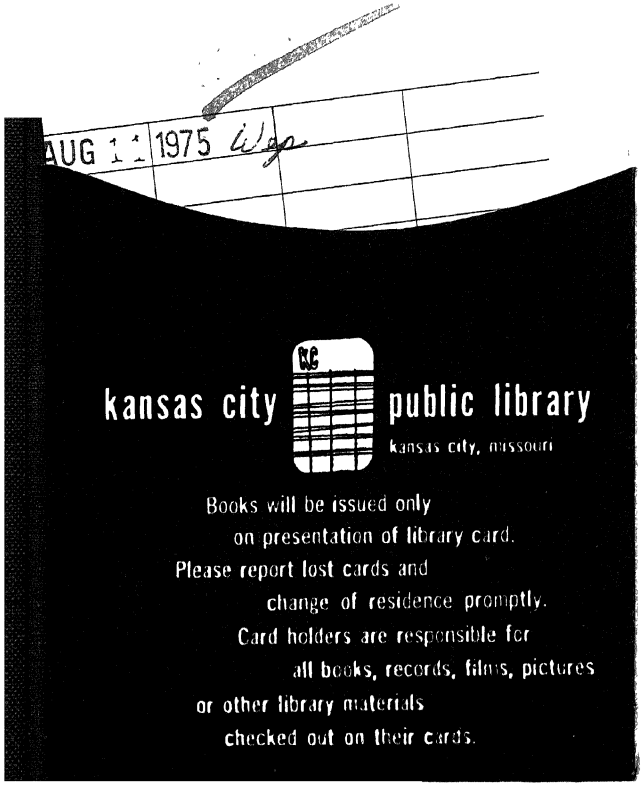
THE CLARINET

AND

CLARINET PLAYING

ROBERT WILLAMAN



Best wishes &
Robert Lupton
from
Bob Williamson
Dec. 30, 1948

THE AUTHOR

The Clarinet and Clarinet Playing

a text for

Beginners, Advanced Players, Listeners

By

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First Clarinet WOR Concert Orchestra, 1929-1935
First Clarinet for many Broadway musical shows

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PREFACE

IN the last 150 years many "Methods" for the clarinet have been written by players of every calibre. These Methods are collections of scales, arpeggios, etudes—exercises for fingering, for tonguing, for improving tone and for phrasing. Most of them were written by teachers for use with their own pupils, to whom they supplied the necessary explanations during lessons. But these Methods are just notes, with occasional short comments which are often clumsy and meaningless translations from the original French, German or Italian. Countless ambitious beginners working alone have been discouraged without getting very far because of the lack of explanatory text. This book aims to supply this need. It is believed to be the first real textbook on clarinet playing ever written. It will enable pupils to go further alone. It will save time now consumed by teachers in repeating fundamental facts to each student. It is also believed that intelligent listeners will enjoy music more if they understand some of the problems encountered by wind players, and especially by clarinet players.

The work is in three main parts. Part I takes the beginner through the preliminary steps necessary for playing in a group such as a high school band. Part II covers complete technical mastery of the three main ingredients of fine playing: tone, staccato, finger technic. The Finger Chart lists all known feasible fingerings and discusses their characteristics—whether flat or sharp of the true pitch, or bright in quality or dull, and whether easy or difficult to blow and to "lip," and in what combinations

they can be used best. Part III concerns Making *Music,* as the final step after the ability to play mere notes.

The material has been assembled as a reference work to be used after the first reading like a dictionary. Chapters on specific subjects such as Mouthpiece, Reed, Tonguing, etc., are started with the problems of the beginner in mind. Each subject is then followed through to completion so that advanced students will not have to search the book for piecemeal bits of information on any one subject.

At the end is a short Glossary of words, phrases and symbols of special interest to practical players in the music business. No attempt has been made to compile a music dictionary. The whole aim of this book is to print everything possible about *practical clarinet playing.*

INTRODUCTION

THE range of the clarinet is divided into three main registers which are produced by the manner of vibration of the air in the tube or bore. In the bottom or *chalumeau* register the air vibrates all in one "piece" from the reed tip to the end of the bell or to the first open side hole. The lowest note on the plain Boehm is low E, produced by closing all side holes. The highest legitimate note in this low register is B♭ on the middle line. (The two top trill keys are considered auxiliary and not "legitimate" notes.) The second register—often called *clarion* because of its clear quality—extends from B natural (middle line) to C natural (second line above staff). The higher pitch of the notes in this register is produced by keeping open the *register* key (thumb key No. 8). This creates a *node* in the air column forcing it to vibrate in three segments and consequently three times as fast as when it vibrates in one. This higher vibration rate creates a pitch 9½ full steps (interval of a twelfth) above the fundamental notes. Thus a whole new and higher scale can be built with the same finger holes and keys.

The third register, *altissimo,* is formed by a repetition of the same process. By leaving open hole No. 2 for all notes from C♯ (second line above staff) to high A above it, the air column is forced to vibrate in five segments at a still higher speed and consequent rise in pitch, while still using the same finger combinations as the two lower registers.

It was the discovery of a method to apply this principle

of nodes to the chalumeau, that constituted the invention of the clarinet in 1690. The range of the chalumeau was too short to be of much use in group playing. It required some time for the clarinet, similar in appearance, to become recognized as a valuable new addition to the orchestra.

The clarinet is potentially the most versatile and useful of all wind instruments. This potential is not now realized because of the primitive state of its acoustical and mechanical development. It is the most neglected instrument of the orchestra. There has not been a single major improvement since the early 1840's when H. Klose, with the help of wood-wind mechanics, adapted for the clarinet some of Theobald Boehm's newly-invented improvements for the flute. The bore, and the haphazard discrepancy in size of the side holes through which the various tones are emitted, are practically unchanged. Flute players are much more fortunate. Boehm made an entirely new flute. He was a rare combination of great artist and mechanical genius. He also had sufficient money to carry out his experiments. What a pity he did not play the clarinet instead! We have never had such a man for our instrument and we may never have, but we hope that some day several men can combine their talents and assets in real scientific research to correct faults and limitations that have remained ever since its invention. The rewards should be bountiful, for despite its easily discernible defects and shortcomings, the clarinet is an essential ingredient of every orchestra and band in the world today. With the present instrument the player is obliged to practice for many tedious hours to try to overcome the faults that should not exist.

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CHAPTER I

CHOICE OF AN INSTRUMENT

THE clarinet in most common use throughout the world is the B♭. This is what the beginner should buy. Later, for orchestral playing, a clarinet pitched in A will be necessary. The bass clarinet, also in B♭, is rapidly gaining in popularity. It has a beautiful tone, and the agility for melody and embellishing figures, but its use is restricted. Players usually change over to it after becoming proficient on the standard size. The small E♭ is not much used and is generally a "double" for one of the regular clarinet players in a symphony orchestra. Large concert bands often use one E♭ clarinet without doubling. It adds a dash of pepper to a large section of B♭'s. This small clarinet is fine for starting a child whose hands are too small for the regular B♭ instrument. Later on the child can transfer to the larger instrument with less trouble than is encountered in changing from a small violin to the standard size. The alto clarinet in E♭, an octave below the little E♭, is also a fine agile instrument with a beautiful tenor tone. It has been strangely neglected by composers and arrangers. It is rarely heard.

The Boehm System is in universal use today. A few old timers still cling to their Albert System "sticks" because of the difficulty in changing over, but all of them

insist that their pupils play the Boehm. There are so few Albert clarinets for sale today that the tyro hardly needs to fear that one will be foisted upon him when he buys. The Boehm System is easily recognized by the four long trill keys in a row on the upper joint, and by the four keys for each little finger, (five if it is a "full Boehm") on the lower joint.

There are several models. Most players use the "plain Boehm," called "17-6" because there are 17 keys and 6 rings for the fingers to operate. There is no ring over the hole for the fourth finger of the left hand. It is the simplest model of the Boehm System with the fewest keys to require adjustment and repadding. There are several other models having extra keys of various degrees of importance and benefit, and the need for them is debated wherever clarinet players congregate.

Model 17-7 has an extra key worked by a 7th ring for the left hand 4th finger. This is the *forked* $B\flat$-$E\flat$. It is a real improvement and detracts nothing. It permits faster and smoother performance of the arpeggios of $E\flat$ major, G minor and one of the three diminished 7ths, and all other mixed passages involving G and $B\flat$ above the staff, as well as low C and $E\flat$. It is unfortunate that low $E\flat$ is disagreeably sharp when forked and should be used only at high speed.

The Articulated $G\sharp$ is a fine addition for use in the major trill of $F\sharp$, top line of staff, and of low B natural, and in passages in three or more sharps. These extreme keys are encountered most often by advanced players who transpose A clarinet parts on the $B\flat$ instrument in orchestra. It is regrettable that this key has one serious drawback. It eliminates the "closed" fingering for high F (No. [*2*] in Chart in Part II) which is very useful in slurs up from the second register.

The left hand lever for E♭ (and for low A♭) is very handy sometimes for eliminating slides, otherwise unavoidable, of one or the other of the little fingers from one key to another on successive notes. The drawback is the added weight and friction which the little finger must overcome, thereby slowing down the speed potential. There is no effect on tone or intonation from this lever.

The low E♭ key extends the range of the clarinet down to concert D♭ and thereby permits the playing of all A parts on the B♭. It also adds a new B♭, middle line of staff, of decidedly different quality from the faulty thumb-key tone. Whether this quality is better or worse is much debated. At least it is an extra tone quality. The quality of the adjacent B natural is also altered, though not nearly so much as the B♭. This low E♭ key lengthens the lower joint about 1½ inches. This extra weight is an appreciable burden on the right hand thumb, and somewhat alters the balance of the clarinet in the hands. All the above-mentioned extra keys constitute a Full Boehm.

A beginner will do well to buy a cheap used clarinet in good repair and use it for a few months until he can play enough to enable him to decide upon the model he prefers for his permanent use.

* * * * *

In addition to the model, the beginner must decide upon the material of which the main body of the instrument is made. Wood, metal and hard rubber are in common use, and plastic will probably become commonplace. The best instruments today are of Grenadilla wood from Madagascar. They are very susceptible to cracking, however, for several reasons. The chief one is the inability of the wood fibres of the outer surface of the tube to expand and contract continually with the fibres of the inner surface as

they are affected by the warm moist breath of the player. When the expansion is too sudden, or if a blast of cold air from an opened door strikes a warm clarinet while it is in use, the outer fibres are apt to separate. Knots, or grain whorls near knots also cause cracks. These inequalities of grain set up unequal stresses of their own and respond unevenly to temperature and humidity changes, thus increasing the probability of cracking.

Sometimes a post that carries a key is screwed into the wood too tightly. As the wood shrinks in extremely dry or cold weather the post cannot shrink with it, and a crack results. A crack across a tone hole is difficult to make leakproof. Sometimes a smear of cork grease on the tone hole rim will stop a minute leak. It cannot be emphasized too strongly that a clarinet must be airtight if it is to be played. Most cracks are in the barrel and main upper joint, because of the proximity to the mouth. The lower joint has smaller variations of temperature and humidity.

A superficial crack often eases the tension and does no harm to the playing qualities of the instrument. But if a crack goes through to the bore it will leak air and render the clarinet unplayable. Filling such a crack is unsatisfactory. The wood "works" constantly with temperature and moisture changes, and crack filler will not stay in place. A metal lining is an expensive but fairly satisfactory repair. A surface crack can be filled to improve appearances with stick or flake shellac applied with a hot knife. The shellac can be mixed with powdered Grenadilla wood for coloring. Woodwind shops sell a ready-made crack filler which is also applied hot. More severe cracks (which still do not go through to the bore) are "pinned" by means of cylindrical metal screws about $\frac{1}{16}$th inch in diameter, threaded all the way. Both ends of the screw are countersunk and covered

with crack filler flush with the surface of the wood. In a good job it is difficult to see where the "pins" were put in. Sometimes a pinned clarinet will develop a crack on the opposite side of the bore from the repair. This results from the same original stresses. Stopped by the pins they are transferred to the opposite point in the circle and are relieved by a new crack. Such a piece of wood may cause continual trouble unless banded by metal rings about ¼th inch wide which overpower the wood stresses. These metal bands, as many as needed, are countersunk into the wood body by a special machine. This is a permanent cure for an unstable piece of wood, and is completely satisfactory if none of the cracks are through to the bore. In buying a used clarinet look carefully for cracks. They close as the wood dries out when not in use and are often impossible to detect. The wood is covered with fine pores that are ordinarily less than a half inch long. They are sometimes hard to distinguish from cracks though cracks are usually much longer. Beware of extra long pores.

Most wood clarinets have a center joint in the main body that carries the keys. This is called the two-piece model. Better key alignment is maintained in the one-piece model (without center joint) and breakage of the bridge key through careless assembly of the instrument is eliminated (see Chapter VI, page 53). Better quality of G♯ (first space above staff) and low C♯ is possible also. The hole can be placed farther down the tube because there is no joint to interfere. This requires a larger hole giving better venting and quality to the tone. On the other hand a bad crack in the upper half condemns the whole clarinet. In a two-piece model only the upper joint needs to be replaced. Also, the one-piece clarinet requires a longer and more awkward carrying case.

Metal clarinets are fine for their principal purpose—to provide a cheap playable instrument with all essential keys for beginners and for amateur organizations who do not want to spend the money for good wood clarinets. Metal will stand more abuse than wood, and will not crack. Nearly all metal clarinets are in one piece.

Hard rubber is used for clarinet bodies largely because it looks so much like wood—*at first*. Handling it soon gives it a high polish that wood never acquires. Detection becomes easier with the passage of time. Rubber does not crack as does wood, but when cold it is brittle, and when used in high temperatures, as under a circus tent, it has been known to become bent noticeably with the pressure of the hands against the right thumb. In cold weather rubber clarinets occasionally break across a tone hole if dropped on the floor. This is especially true of the lower joint, weakened as it is by the large holes.

Sulfur has a tendency to work to the surface of hard rubber. This not only turns it greenish, but it hastens oxidation of metal with which it comes in contact. The keys of rubber clarinets soon tarnish to a dirty lead color unless nickel plated. Bearings wear and keys become loose faster because of this chemical action on the metal.

CHAPTER II

THE MOUTHPIECE

ALL clarinet mouthpieces are quite similar in outward shape and appearance, except for color. The tapered round body has one side flattened to form a *table* on which the reed is fastened by a metal *ligature*. The smaller end is sharpened into the *beak* to require the minimum opening of the mouth for playing. The interior throat or tone chamber remains about the same from the earliest days, though minor changes in shape have been introduced by different makers searching for better tone quality. However, the greatest single factor in tone quality after the reed, is the *lay* of the mouthpiece. This is the curve of the table for the last 5/8 inch (approximately) of its length, which provides room for the reed to vibrate and thus produce the tone. The length of opening and degree of curve are all-important. In the U. S. the French school or style of clarinet playing is almost universal, and the medium French *facing* of the lay is in greatest use.* The

* The German lay is much longer and more open. It requires more effort to play it. It gives perhaps a louder tone, though it is hollow—"tubby." It is nearly impossible to buy reeds shaped to work on this long and open lay. Most players make their own. It is a difficult and tedious job to keep themselves supplied. The number of people playing the German lay is decreasing constantly. It is almost as obsolete in the U. S. as the Albert system clarinet. There seems to be no reason for anyone starting to use it.

metric measurements for an average medium French facing are as follows:

Thickness of gage blade	*Distance in when stopped*
.75 millimeters	1½ mm
.50 "	3 "
.40 "	4 "
.30 "	9 "
.25 "	10 "
.20 "	11 "
.15 "	12 "
.10 "	13 "
.08 "	13½ "
.05 "	15 "

These figures are obtained by placing a piece of plate glass or carefully flattened steel bar, graduated by millimeters, on the table of the mouthpiece, the end flush with the tip of the latter, and inserting one after another the leaves of a metric thickness gage. As each leaf is stopped by the converging angle, the distance from the tip in millimeters is recorded. The above figures are of an *average* French lay. There are many minor deviations from these figures possible. Some players like the curve shorter and more open at the tip. Few like a tip opening greater than one millimeter. Most prefer less. On this lay the ordinary brands of French reeds, which predominate in this country, will play with the least "carpentering."

In addition to the proper length, pitch of curve and width of opening at the tip, it is essential that the curve of the two "rails" (sides) of the lay be identical. The leaves of the thickness gage must all stop at right angles to the bore. If one side is a little lower all the way along, the mouthpiece will blow hard and sound fuzzy because

the reed will not only vibrate back and forth but it will also have to twist a little to meet the lower side. Since this happens several hundred times per second, the importance of a straight lay is easily understandable. If a lay is low on one side at one point and low on the opposite side at another point, the mouthpiece is sure to squeak and blow badly because the reed cannot close airtight against it.

Wood was the material originally used for all mouthpieces, but it warped so badly in the saliva that it seldom played the same for two days in succession. The reed soon wore a track in the lay which had to be refaced. The water-soaked and cross-grained tip was fragile and broke off easily. Players were thus compelled to change mouthpieces frequently, and tone and intonation suffered.

Hard rubber replaced wood long ago and it is in almost universal use today. Its principal hazard is heat, which softens it so that the slightest touch warps it out of shape and makes it useless. A rubber mouthpiece must never be sterilized by boiling.

Plastics of various kinds and colors are coming into use and mouthpieces will undoubtedly be improved as new plastics are discovered.

Many professionals play glass (crystal) mouthpieces. Being heavier and less vibrant then either rubber or plastic, glass clears up much of the annoying buzz in the tone of many players. Others with naturally cold or hard tone quality should not use it. Glass does not warp and wears so slowly that no reed track is visible after twenty or thirty years of constant use. Its great drawback is its fragility. The tip can be broken off so easily that a player literally guards it as he does his eyes. Beginners are warned against the use of a glass mouthpiece for this reason.

In searching for the best mouthpiece for himself, the

player must look for quality of tone and correctness of intonation in equal degree. The former depends upon the shape of the throat, under the reed. The latter is largely governed by the diameter and taper of the circular bore that is the continuation of the bore of the rest of the clarinet. This taper is as much as .015 of an inch in some makes, in the two inches of its length.

Next comes the matter of "speaking"—the way it responds to the attack of the note by the tongue. Speed of staccato is the greatest single shortcoming of a reed instrument. Therefore the ease and rapidity of attack is of prime importance.

As the choice narrows down to the best half dozen, determination of the one best mouthpiece of them all is very difficult. Even slight variation in the lays requires compensating difference in strength and shape of the reed. One reed obviously cannot be changed back and forth repeatedly for trial on several mouthpieces. So a reed is fitted to work best on each mouthpiece. But each mouthpiece and each reed plays, responds, and sounds different. This produces a bewildering assortment of conditions to be judged. Players frantically searching for the best frequently forget the all-important matter of human adaptibility, and they go on for years, blowing every mouthpiece they see, and condemning them all. Their friends call this "mouthpiece disease." One well-known player has been known to try as many as 300 mouthpieces in one day. There is no possible chance of a man being able to judge even superficially the merits of so many in so short a time. Ear fatigue begins after a dozen or two trials, and the poor lip cannot adjust itself for even reasonably good performance on so many different lays. The thing to do is to try a reasonable number of mouthpieces and to select from them

the three or four that work the best on short trial. In a week or two the best one of these should be apparent. *Stick to it.* Resolutely push all others aside. Your physical makeup will adjust to it and it will become a natural part of the whole mechanism of playing. At the end of a month with it, the two or three rejected ones will seem to be definitely inferior. In other words, pick a reasonably good mouthpiece, learn to play it, and make up your mind to be satisfied with it as long as it does not warp. As a general rule the mouthpiece grass is just as green on one side of the fence as on the other.

CHAPTER III

THE REED

THE greatest artist is an abject slave to the sliver of bamboo that produces the tone of the clarinet. No matter how skilled he is, and how good his clarinet and mouthpiece, he is a constant victim of the vagaries of reeds. No two are exactly alike. This means that each box of 50 or 100 contains a few very fine reeds, some good reeds, and some more that can be used in unimportant places such as the second clarinet section of a band. But the majority of reeds must be thrown away as useless because of poor tone quality or response to attack or because they are flat in the high register. Reeds with crooked or coarse grain, or of a dead brown color are obviously no good. Among the others it is impossible to pick out the good reeds by looks alone. They have to be tried before they can be appraised, and often it requires several hours of breaking in before a questionable reed can be labelled good or bad. Reed tips are thin and easily broken. Even fine reeds are short lived. New ones must be discovered and broken in constantly. The best reeds obtainable in the United States are from bamboo grown in southern France near the Mediterranean. Shortages are helped out with cane from Spain and Mexico, and some West Coast players cut their own cane, which

they find quite satisfactory, along rivers in southern California. The stalks are cut and seasoned by slow drying and the straight grained sections are run through various machines to shape the finished article that is for sale in all music stores. Up to thirty or forty years ago many players bought the cane "in the round" and made their own reeds. This is a laborious process, for the material is hard to cut. It dulls the edge of a good knife very quickly. Improvement of machinery made this practice obsolete. However, it is well for players to make a few just for the training it gives them in altering factory made reeds for their own use.

Because reeds are merely shaped from a living, growing material, man has no control over the actual substance and structure. Reeds cut from the same stalk can differ as much as brothers in a family. They are better if made from the sunny side of a stalk than if made from the shady side. Male cane is supposed to be better than female cane. Other factors, known and unknown, enter into reed performance. What is well known, however, is that only a small percentage of reeds in a box can be used. One of a teacher's most difficult tasks is to convince the parents of young pupils that most new reeds must be thrown away as useless. A rank beginner can use almost any reed that produces a sound with a reasonable amount of air pressure and effort, because a beginner cannot produce a really fine tone with the best possible reed. But as he progresses he becomes more and more discriminating and uses a constantly smaller percentage of the reeds he buys. Professionals use quantities of reeds in proportion to the artistic standards of the jobs they play. One well-known player is reputed to have run through as many as 10,000 reeds in one year in order to provide himself with good ones at all times for his exacting work with one of the major orchestras. This is an ex-

treme case. The average professional player uses probably 500 reeds per year.

Playable reeds, like clothes, usually have to be altered in shape for the individual user, because of the differences in mouthpieces, tooth formation, shape of mouth and throat, etc. If the tone quality it produces is good but the reed does not play well because it is too soft or too stiff, or does not "speak" easily when attacked, the shape can be changed to give it the desired playing qualities. It would be as foolish to throw away such a reed as to throw away a pair of trousers because the legs were too long or the waist too large. "Tinkering" reeds is a science in itself that requires the knowledge of what needs to be done, and skill in doing it. A wise teacher shows his pupils how to fit reeds as soon as possible. Often a pupil has given up in disgust because a clarinet "blew so hard" and sounded so badly, blaming the condition on himself. Properly fitted reeds would have given pleasure without discomfort in playing and would have induced him to keep on with his studies. To be artistic in any line the artist must do his work with the least possible amount of physical effort. If it appears labored it is not artistic. For your clarinet to sound good to you and to others you must play easily and comfortably, without undue exertion. This you cannot do on a reed that is not fitted properly to your mouthpiece and to your own peculiarities of handling it. It is much simpler to alter the reed to suit your needs, than to alter your whole physical mechanism to meet the requirements of a badly adjusted reed.

The reed is merely a spring, but a very delicately adjusted one, that bends or vibrates over the "break" in the lay, under the pressure of the breath, and which bends back to its original position against that pressure. These round trip vibrations occur at the rate of about 146 per second

for low E on the B♭ clarinet and about 1,868 per second for the highest note in the range, C on the sixth space above the staff. Thus the strength, shape and resilience of the spring must be very minutely adjusted. Different reeds in the same box can be too soft, too stiff or just about right in strength but responding badly to *attack*. Once in a great while a new reed can be played at once without any alteration. This is a rare event.

Reeds are of course constantly wet while playing. The density and composition of reed cells differ greatly. Hence they react to the saliva in different ways. They must be thoroughly moistened in the mouth before they can be judged. Sometimes in spite of seasoning a reed will soak up and become soft in a minute or two so that trimming is necessary. In extreme cases trimming must be done three or four times in the first hour. This usually indicates that the reed is hopeless—the fibre does not have the stamina and resilience to vibrate at the required speed for high notes. Sometimes, instead of soaking soft, a reed will swell in thickness and become stiffer, requiring successive scrapings of the spring for several days for proper playing resistance. These reeds usually become good and last a long time. It is thus easy to see that measuring the strength of reeds while dry on a meter in a music store is of very little help to a player.

A reed is too soft if the tone is thin and nasal and "speaks" with so little effort that it ceases entirely if the air pressure is increased to produce a medium loud sound. The tone stoppage will be more persistent the higher the tone is in the scale. The remedy is simple. Cut 1/64th inch or less from the thin tip. This can be done by means of a reed trimmer, available at music stores, or it can be cut off by scissors, using a piece of tin from an ordinary food can

cut to the shape of the mouthpiece tip as a pattern. The home-made pattern is often superior to the original reed shape or to the shape made by commercial trimmers, which are frequently too rounded at the corners. Some players cut clarinet reeds on alto sax trimmers. They are wider, enabling reeds to miss much of the curve at the corners. When the amount of trim needed is so small as to be hard to do with either scissors or commercial trimmer, fine sandpaper can remove an almost microscopic amount. Skill is required, and old reeds should be practiced on before risking good new ones. There are two methods. First, place metal reed form on reed with the tip of the latter protruding a very little way. Hold a piece of sandpaper about two by four inches in the right hand and draw it with light fast strokes across the reed tip flatwise toward the metal form. The form prevents tearing of the reed. The second method is to hold the reed alone in one hand and to draw the sandpaper again with light fast strokes sidewise, alternately from each corner toward the center. The pressure used must be very light or the delicate reed tip will tear or crumble. The reed tip should exactly parallel the curve of the mouthpiece tip.

Trimming the tip places a thicker part of the reed taper in the vibrating zone. Being thicker it is stronger, offering more resistance to breath pressure. If one cutting is not enough, more can be trimmed off, as many times as needed to arrive at the proper resistance. Stop cutting when the playing pressure arrives at the point you have come to consider normal for best results—musically and in the matter of physical comfort. When this point is reached the upper tones in the register will have improved in pitch and quality to match the low register. At the same time the low tones will have lost their disagreeable nasal quality.

Beyond this point, more trimming of the reed will hamper its work. It will blow hard and the low tones will be fuzzy, dull and breathy. If the extra pressure is not applied the reed will not vibrate at all and the only sound will be of the rush of air through the tube. Forcing a reed that is too stiff can cause dizziness at worst, and quick fatigue at best. This is unnecessary.

A reed that is too stiff needs the opposite treatment. The spring must be scraped thinner to weaken it until it will vibrate with comfortable air pressure. The part of this spring that governs the ease of bending is located almost entirely in the region extending ¼ inch each way from the break in the curve of the lay. This half inch of reed determines its resistance to the breath. To scrape a stiff reed use a small pocket knife or similar blade. Small sharp scissors are also excellent. The flat bevel of the edge insures against cutting too deeply. Safety razor blades are too sharp and flexible for a good job. Lean the back of the blade forward toward tip of reed so that you *scrape* instead of cut. If the cutting edge of the knife is forward it may enter the fibres too deeply and create a weak spot that ruins the reed. Scrape only *toward* the point of the reed. Strokes away from the point will raise tiny ends of fibres because of the bevel cut. These upended fibres will irritate the lip.

In extreme cases the scraping must be started from the beginning of the cut or spring where the shiny outer surface of the cane has been cut away. This is sometimes necessary where a reed has had to lose an eighth of an inch or more of the tip to acquire strength to vibrate. Exceptionally fine reeds which have become old and watersoaked can be given a new playing life by cutting off a quarter inch

or more of the tip and starting a whole new spring an equal distance back of the start of the original one. Such reeds can be reshaped over and over until they are too short to be held by the ligature or too narrow to cover airtight the throat opening in the mouthpiece.

The shape of a finished reed that plays well is a smooth, graceful curved taper. Viewed from the side it resembles the catenary curve of the main cable of a great suspension bridge. There must be no ripples. The high spots of ripples are merely dead weight which the spring must carry back and forth, for a spring is no stronger than its thinnest spot. Ripples can be detected easily by shadows. With your face in darkness, hold the reed just under the shade of a desk lamp. Slowly tilt it until the light begins to come over the tip in the same way that the sun peeps over the horizon in the morning. Slight inequalities in the surface will be strongly silhouetted as are bumps in the road by low headlights of an auto. Ripples and irritating fibres can be smoothed by a piece of sandpaper over the thumb. Number 4/0 grit is about right.

It is important to understand that the reed must seal the mouthpiece airtight every time it vibrates, to enable each vibration to get away "clean" down the tube. If the reed is not tapered so that it bends exactly parallel to the curve of the mouthpiece lay, air will enter under the sides of the reed continuously, thereby blurring the individual vibrations and fogging the tone. Therefore, in addition to having the right amount of strength in general for easy, comfortable blowing, this strength must be so distributed throughout the spring that the reed touches the rails all the way to the tip. The precise area for scraping within the crucial half inch of bend will of course differ with each

reed and mouthpiece. Practice scraping of all reeds good and bad will give you experience to judge where a reed needs to be worked to clear up tone quality.

One simple test helps to judge if a reed is airtight. With reed moistened and fastened in place hold mouthpiece in left hand and seal lower end with the right thumb. Then suck out the air as completely as possible. A reed that is much too soft can be overpowered by the vacuum created. It will remain curved against the lay indefinitely. A stiff reed may not be induced to give in at all to the force of the vacuum. If a soft reed will not hold a vacuum for even a second or two it is because it does not bend parallel to the lay. When its strong spot is found and correctly weakened by scraping so it will hold a vacuum, it is then a simple matter to trim the tip of the reed for proper playing strength. A reed that plays and sounds well will remain against the tip of the mouthpiece for two or three seconds. During this time a hiss of air will be audible as the reed struggles to free itself from the pull of the vacuum. At the end of this time the leaking air will have reduced the pull to the point that the reed jumps back straight with a "pop" as when a cork is pulled from a bottle.

It is seldom that the last one-fourth inch of reed tip needs to be scraped. It is already so thin that it conforms easily to the curve of the lay. If too thin it may tend to vibrate differently in two segments, as is often the case with a badly split reed, when the tone is attacked. When this happens a disagreeable "tweek" is produced. Only after considerable trimming of the tip does it become so thick as to require scraping.

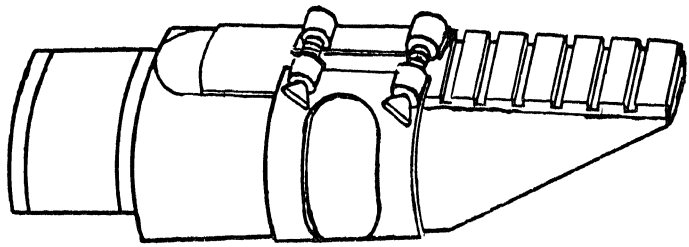
Many players use Dutch rush for reed shaping. It is a plant that grows in swampy ground in most parts of the

United States. The stalks are two or three feet high and break apart easily at the joints in sections three or four inches long. When dried they are like small round files, about as large in diameter as an ice cream straw. The main criticism of this material is that it is thick enough to obscure the view of the exact spot of contact on the reed. Like sandpaper it is mainly useful for final smoothing of a roughened area, especially since it is so fine it cuts slowly. For exact work there is nothing so accurate as the blade of a knife or small scissors. Oboe players the world over make and alter their reeds with knives. Being much smaller, oboe reeds require extra finesse in adjustment. This cannot be obtained with either sandpaper or Dutch rush. Clarinet players will do well to copy the tactics of oboe reed makers.

Some players foolishly think that the thick center rib of a reed must never be altered, that only the edges and tip of a stiff reed should be scraped. This supposition has no basis in fact or reason. The strength of a reed is of course in the center rib. It is exactly the same principle as the leaf spring of a vehicle. If a wagon or truck spring is too strong, the full-length leaves are not touched. Instead, one or more short leaves are removed from the *center*. So must the *center* of the spring of a clarinet reed be weakened, by removing center fibres. To complete the inconsistency, players who say the center should not be touched, disobey their own rule every time they trim the tip. After trimming, the reed must be moved up on the lay. This *alters* the rib in the vibrating zone by bringing a thicker portion of it into playing position. The plain fact is—if the center rib of a reed is too strong to vibrate properly and comfortably for the player, because of extra thickness, or because of

extra inherent fibre strength, it must be scraped down to the desired strength for proper performance. There is nothing sacred about this center part.

A reed does not vibrate merely around the perimeter in the manner of the floppy brim of a hat on a woman's head. The *whole reed bends* straight across over the break in the lay until tip meets tip and the sides of the reed meet the rails of the mouthpiece face. This can be proved easily as follows: With a jeweler's hack saw make six or more lateral cuts across the grain on the thick round uncut end of a reed. Make the cuts progressively deeper toward the tip, so that the bottoms will approximate the shape of a normal reed spring. Fasten the thick end of this reed on the mouth-



piece as you ordinarily fasten the thin end of a normal reed, and blow it in the same way. It will produce a tone, though not a very good one, of course. But it will prove that the under side of a reed remains flat at all times, and that all vibration is lengthwise.

Because of differing fibre strengths that man has not yet been able to estimate in advance, proper center thickness of each reed can be determined only when it is played on. And even if fibre strength could be calculated, the infinite variations of mouthpiece facings in common use would

compel each man to have reeds made at the factory to his own special measurements. If machines in factories have to cut down original center thickness in order for a reed to be played by *anyone,* is there any reason why each player should not complete the job of adjusting the center rib strength to meet his individual needs? The unpredictable reaction of cane to saliva is another factor that makes necessary the alteration of the center rib of nearly all reeds before they are broken in ready for public performance.

Seasoning improves the quality and longevity of reeds. Reeds known to be fifteen years old give much better performance than new reeds. If it is too new, cane will have a grass-green tinge. Well-seasoned cane is a golden color. Seasoning should be done under reasonable conditions. Left in the open air, reeds can dry out too fast or too completely and be brittle, and harsh in tone. If the air is too moist they can spoil and be covered by a fine mold. For best results, unopened boxes of reeds for seasoning should be wrapped in corrugated cardboard and several thicknesses of heavy paper so there can be no day-to-day change in the moisture content of the air wrapped with it. Under these conditions, in an ordinary room where steam heat is not excessive, the sap in the cane will dry slowly. It will also change chemically into a resinous consistency that is not readily soluble in the saliva. In two or three years cane will improve greatly. Reeds will water soak much more slowly. Long seasoning is not a cure-all but passable reeds will be better and good reeds will be much better and all of them will play longer than green reeds. What is more to the point, a much greater percentage of the reeds in any one box will be playable.

There is still another factor in the process of breaking

in a new reed. There is little doubt that a molecular adjustment to vibration takes place, similar to that in "playing in" a new violin, though in lesser degree.

A reed has a life cycle similar to that of a living creature. It requires a few hours or a few days of playing for it to arrive at its prime. It stays at its best for a few days or in rare cases for three or four weeks, and then it begins a decline in its powers that differs just as much in the span of time. Since no two reeds are exactly alike, and since it is rare that two reeds nearly alike will fall into the hands of a player successively, "breaking in" consists partly in the player's becoming accustomed to it, which takes time.

In general, a new reed favors the lower register. As it goes through its life cycle the register at which it performs best gradually is higher. The pitch of all tones, especially in *altissimo,* is also higher. This is due to the dissolving into the saliva of the organic parts of the cell structure, leaving the mineral cell skeletons which vibrate more readily and quickly but more harshly because they are deprived of the organic padding that mellowed the tone. Finally, old reeds acquire a buzz and the tendency to jump into high harmonics. These "canaries" are final proof that a reed should be discarded.

Questionable new reeds should be dried and laid aside for a while. After two or three weeks they can be better or worse. Those which have deteriorated should then be thrown away. Those which have improved often develop into fine reeds when broken in. Some reeds require much more time than others for breaking in. There is no rule for guidance. Each reed must be judged for its own merits.

When through playing each time, the reed should be wiped clean and held against glass or other flat surface by

elastic or a spring arrangement to compel it to dry flat. Reed cases for accomplishing this are sold in all music stores. Every day or two reeds should be gently scraped with a scissors or dull knife blade to remove food particles that collect in a film on reeds as on teeth. Aside from the matter of sanitation, this accretion should be removed for musical reasons. It adds weight that has to be carried back and forth on the millions of trips to the tip of the mouthpiece. It retards the response to attack, and dulls the tone.

* * * * *

The perpetual trouble with reeds made from even the best cane has given impetus to a search for a substitute material. As long ago as 1914 aluminum and hard rubber were tried. The ingredients and the shape could be accurately controlled but the results were literally awful. These reeds blew easily but the tone was little more than a buzz—like paper on a comb. The aluminum reeds could be held in good tune up to the top of the register, but the coefficient of elasticity of the rubber was not high enough to enable the upper tones to be played up to pitch. Also the rubber reeds squeaked frequently. This was caused by the constant warping back and forth with temperature changes in and out of the mouth. These reeds were clinically interesting but musically impossible.

Recently plastic reeds have been marketed in some quantity. So far none of them are the equal in tone quality or maneuverability—especially in the high notes—of really good cane reeds. Players of the larger instruments such as bass clarinet and tenor and baritone sax have better luck with them. The slower the vibration rate the nearer plastic reeds approach cane reeds in playing qualities. Plastics are

being improved all the time. One of them may some day approach or even surpass the instant resilience and light weight of bamboo.

One definite advantage of present day plastic reeds to dance players is that they do not have to be moistened to play well, and there is nothing to dry out. It is thus possible to play a "hot lick on a cold stick" with no worry that the reed has dried and crinkled on the end. It has always been a problem for a player of many instruments to keep cane reeds moistened in instant playing condition when not in use. Some players have resorted to wrapping reed and mouthpiece tip in a wet rag when a certain instrument would not be used again for several minutes.

Glass is one of the most nearly perfect elastic substances known, up to its breaking point. If it could bend the required distance over the curve of the lay it might make the best reed yet known. A piece of solid glass cannot do this. It breaks. But finely spun and laminated glass may some day be produced that can bend far enough and return without breaking. It may offer the best hope of ultimate escape from reed troubles that now beset all players.

CHAPTER IV

CARE OF INSTRUMENT

THE clarinet is a complicated machine and requires care and intelligence in operating and servicing if it is to have a long and useful life. The beginner should learn about this phase of it before handling it.

Moisture in the breath condenses in the bore most of the time. Usually it drains straight down the tube and drips out the bell harmlessly, except in hot dry weather or in excessive steam heat. This moisture seldom causes any trouble while playing, but it should be wiped out before returning the clarinet to the case. Excessive swabbing of the bore to remove moisture is bad. In the course of a few years the bore can be measureably enlarged with resultant alteration of the intonation. The best swab is a piece of *old* clean cloth the length of the clarinet and not too wide and bulky to pass through easily. The hard weave of new cloth is more abrasive and wears the bore faster. Furthermore, if a swab of old cloth is caught on the interior pipe of the register key it will tear and be released. New strong cloth or chamois can become wedged so tightly as to dislodge the pipe. Tie a strong cord to one end or corner of the cloth selected, and tie a small metal weight to the other end of the cord. Be sure all corners are rounded to prevent

scratching of the wood. Drop the weight into the bore and draw the cloth gently until it appears at the other end. Let it stay there a few seconds, then pull it on through. Do this only once. If the cloth is not oily it will absorb all the moisture. Remove moisture from joints with a rag around a finger end. In the case see that the joints are pulled out as far as space permits, so the air can complete the job of drying.

If while playing the moisture detours through one of the side holes the note gurgles when the key is opened. The worst offender is the G♯ (first space above staff) because it is the farthest underneath in playing position. A quick remedy is to blow at the hole with the key open and to shake the clarinet in the direction to force the inner stream of water away from the hole. If the gurgling persists insert the swab in the bore and leave it there while you slip the corner of a handkerchief or cigaret paper under the pad. Capillary attraction in both directions should absorb all the moisture. If the trouble continues, dry the instrument thoroughly in the open air, remove the key, and swab the hole with an oily rag, and reach into the bore from the center joint and paint a circle of oil around the tone hole with a match stick or small brush. The water will not go where the oil is. This should cure the trouble for a long time. Trouble with water in this G♯ key hole can be largely avoided by laying the instrument on chair or table with the four trill keys up when not in use temporarily. Gravity will drain the moisture away from these holes toward the solid side of the bore.

No matter how careful you are with the toothbrush, minute particles of food will lodge in the mouthpiece. When through playing each time they should be removed by a soft cloth before they have a chance to dry hard. The cloth

should not be drawn over the tip of the mouthpiece. This tip is so narrow it can be worn down quickly. Treat the whole lay of the mouthpiece very gently always. If a disagreeable odor develops it can be neutralized by any good mouth wash or by grain alcohol. *Never use heat* to sterilize rubber, plastic or glass. It softens the first two substances to the point that they warp easily with handling, and glass is apt to shatter. Heat will also loosen the cork on the joint.

Wherever two pieces of metal rub together there should be oil, whether it be an auto or a clarinet. Every two or three weeks small drops of sewing machine oil should be applied with a wire or toothpick to every spot in the mechanism where there is friction. Then, if there is end play in the keys, and there usually is, push them back and forth endwise so the oil will work along the rods where it is needed. Once or twice a year the keys should be removed and the old oil and grit taken off rods and screws by a rag dipped in alcohol. A pipe cleaner will clean the key tubing. When reassembled with fresh oil on bearings the action will be noticeably lighter and faster. A screw that is allowed to rust tight in a post requires an expensive repair job. Avoid this by keeping the threads oiled.

Needle and flat springs should be oiled where they are attached to post or key, and where they rub in the key hook or on the track. If a spring breaks, a rubber band will usually provide an emergency repair, but it should not be left on longer than necessary. Rubber eats into the key metal rapidly due to the sulfur in it.

Every player should know how to replace pads, especially the small ones on the upper joint which wear out quickest. They are short lived because they get the most breath moisture and because they are so small there is more spring

pressure per millimeter of contact with the tone hole rim than on larger pads. The constant thumping on the rim eventually wears and cuts them through. When this happens the pads leak, for the felt centers are porous. A leak may be so small as to be hard to find, and may only make the clarinet blow hard and sound dull and fuzzy. A real leak will cause all notes below it on the tube to squeak out of control. Pads are fastened in key cups by hard shellac (stick or flake) which can be melted by a match. Easier and cleaner to work with is a small alcohol lamp or Bunsen burner. Each new pad should have a small needle hole in the edge to allow the escape of the expanding air in the heating process. Otherwise the pad will bloat and be unable to receive an impression of the tone hole rim. If the back of the pad is too smooth for the shellac to grip, it should be roughened with a needle point. The pad is then floated in shellac heated to the consistency of soft putty. By allowing the key to flip against the body of the clarinet repeatedly, the pad will settle exactly parallel to the tone hole rim. Pads do more than cover holes airtight. Their thickness governs the width of opening of the keys, which is one of the major factors governing intonation. The novice will do well to have the new pad protrude from the cup as far as the old one did. A thin pad sharpens the pitch and brightens the quality of the tone it governs. A thick pad flats and dulls the tone. Most professional players prefer to adjust their own pads because they know the bad notes on their own instruments and how they should be favored one way or the other.

When bringing a wood clarinet into a warm room from extreme cold outside, open the case and allow the air of the room to temper it as long as possible before blowing into it. The outer fibres should be warmed and expanded first. For

speedy warming, hug it under your arm inside your coat until it approaches body temperature before playing. If blown through while very cold the danger of cracking is greatly increased. The fibres of the bore expand so rapidly with the heat of the breath that the cold outer fibres cannot go along and they separate to form a crack.

The joints of a wood clarinet will be tighter in damp weather than in dry. They loosen when steam heat is turned on in the fall. If the looseness is only slight the cork can be swelled by moistening and then gently heating over a match with the flame two or three inches below the cork. Turn the joint around slowly as the heat is applied to avoid burning the cork or melting the shellac that holds it on. If heat does not tighten sufficiently, a good simple remedy for loose joints is the addition of a few turns of fine thread, No. 70 or 80. Spread the turns evenly and tuck the loose end under the last loop, then smear on cork grease and work it thoroughly into the thread. Whenever such a joint becomes too tight through atmospheric changes it is easy to remove as many turns of thread as necessary to allow easy assembly and still preserve an airtight seal.

Steam heat also frequently loosens rings on joint ends. This increases the danger of cracking. These rings are not put there for ornament but to confine the wood fibres and to take the force of the thrust of assembling the joints of the clarinet. If the ring is loose on a socket, the tenon of the other joint may force the fibres of the socket apart. These small cracks often develop into large ones. Rings can be made smaller in a special crimping machine used in wood-wind shops. They should be so tight as to require to be driven on with a mallet. If no crimper is available, put a piece of drum head or stout paper over the socket like a cap and drive the ring on over it, then cut away with a sharp

knife all material that remains visible. Some cheap foreign clarinets arrive in the United States with joint rings roughened on the inside by a sharp pointed tool. These tiny metal points dig into the wood and hold the ring in place even though it is loose through wood shrinkage. This deceives the owner into thinking that the rings are performing their primary function of holding the socket wood tightly to prevent splitting. Before tightening rings of a clarinet, the inside surfaces should be filed smooth. Rings should be held in place solely by their snug fit.

If a wood clarinet is allowed to dry out too much it can shrink endwise enough to cause the bearings of certain keys to bind. It is unfortunate to have to file off the key rods or tubing to relieve the friction, for as soon as the clarinet is played again regularly the wood expands and there is then end play where the metal was removed. Excessive end play can cause pads to touch at different points as they engage the tone hole rims. This produces squeaks or blanks of no sound due to faulty covering. Once the tone hole rim has made an impression in a pad it should always engage at exactly the same spot. Excessive drying out can be avoided by keeping the clarinet in the case at all times. If not played for a long time a small damp rag in the case will supply needed moisture, in the manner of a cigar case humidifier. Mustiness can be avoided by an occasional airing for an hour or two.

Dust and the lint from the swab gradually build up a deposit inside tone holes that affects intonation and tone quality. Whenever evident this deposit should be removed. With the keys off this can be done easily by a rag over a soft pine stick, dipped in alcohol. Work gently to avoid scarring or wearing the surface of the holes. While doing this, worn pads should be changed.

CHAPTER V

FITTING INSTRUMENT TO OWNER

LENGTH and strength of fingers and shape of hands differ. Clarinets are all of one pattern in each make. Keys can be bent to fit more easily than fingers can be trained in unnatural positions or motions.

Levers 18 and 19 (see Finger Chart, page 127) often need to be bent to fit the player's hands. If the left thumb is long the whole hand will be higher in playing position. This will place the little finger farther across the clarinet. Levers 18 and 19 can be bent to accommodate. A short left thumb provides a better and more comfortable position for the whole hand by dropping it down more to the side of the instrument rather than on top. 18 and 19 must be bent in the direction opposite to that for a long thumb.

The G♯ key (first space above staff) can be bent up or down to match the best finger motion. The bumper cork underneath can be altered in thickness as needed to provide proper venting of the tone.

Many players with thick fingers hit keys 15 and 20 when they do not want to. These keys are often much wider than necessary. They can be filed or ground down to the thickness of ordinary wire with no detriment to the instrument. Playing before a mirror often reveals that these two key arms are not parallel to the fingers. It is a simple matter

to bend them parallel so that they are out of the way of normal finger motion.

Various other adjustments can be made on keys and levers to help the fingers assume the most natural position while playing.

Spring tension is a very individual matter. In the factories clarinets are assembled and springs are adjusted by mechanics who usually can play very little if at all. They set springs to close pads over holes, and succeed completely, but often they use more tension than necessary. This requires more finger strength and slows down speed. Springs which *close* keys must of course be strong enough to make a correctly seated pad airtight. Springs which *open* keys require less tension. The fingers have to overpower them first and then use extra power to close pads airtight against this counter force. Springs governing keys 17, 18, 19, 22, 23 and 24 should be adjusted carefully with that in mind, for they are the heaviest and are operated by the smallest fingers.

Needle springs can be strengthened or weakened as desired by means of a "spring push and pull," a double-hooked gadget adapted from the crochet needle. Flat springs—attached to the key body by a small screw—can be curved more or less to raise or lower tension. Care must be used to prevent the force of the bending operation from reacting on the region that is weakened by the screw hole. Breakage often results from this oversight. The best way is to grip the solid part of the spring ahead of the hole in a vice or pliers, making all of the bend in the part toward the small end of the spring.

Thumb rests are often painful. They can be bent to fit, and they can be cushioned by a 16th inch thickness of cork which soon wears to the exact shape of the thumb. Hot shellac is best for fastening the cork to the metal.

CHAPTER VI

ASSEMBLING THE INSTRUMENT FOR PLAYING

IT is well to adopt a set routine for putting the clarinet together each time. For the ordinary wood or rubber two-piece one, the best procedure is as follows: Grip the lower joint in the left hand, avoiding the keys as much as possible. Take the upper joint in the right hand with one finger pressing down the ring over hole No. 3. This raises the attached half of the *bridge key* enabling it to clear the other half on the lower joint. If you do not press down this ring the two parts of the bridge key will meet head-on. It requires only a small amount of force to break off the upper arm. Next insert the stem of the upper joint into the socket of the lower joint all the way. Twist—don't wobble—the two joints around until the two bridge key arms are lined up straight. Wobbling a tight joint may break the tenon. Put the bell on the bottom and the barrel on the top and the mouthpiece in the upper end of barrel. Line up table (flattened side) of mouthpiece with thumb hole of clarinet. Select a reed and moisten it thoroughly in the mouth. It may crinkle along the tip due to the swelling of the outer fibres before the inner fibres become moist. As soon as the fibres all the way through become moistened evenly they will swell evenly, and the reed will straighten

to bend them parallel so that they are out of the way of normal finger motion.

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out. Good reeds approaching the end of their usefulness are prone to this. The older they get the longer it takes them to become saturated and flat. Straightening can be hastened by placing the reed crosswise on the table of the mouthpiece and pressing it with the thumb. Be sure the reed tip does not protrude over the edge. If it does it will be broken by the thumb pressure. Now fasten reed to mouthpiece by metal ligature. It is advisable to have the ends of the ligature under the screws come together on the reed. The constant tightening and loosening tend to "chew" the surface underneath. If this is the mouthpiece itself, bad scars result that spoil appearance. The damage can be so severe as to prevent minute adjustment of the ligature. Since reeds are thrown away frequently it is best to have the damage on them.

If the mouthpiece is rubber do not tighten the ligature screws with real force while cold. Rubber expands a great deal more than metal with the heat of the breath. If the ligature is too tight the mouthpiece will warp and buckle out of playing shape.

The reed must be exactly centered sideways on the table, and its tip must be slightly below the tip of the mouthpiece. It must have something to hit against and bounce back from as it vibrates during tone production. The level edge of the mouthpiece tip, about $\frac{1}{32}$nd inch wide, is for that purpose. If the reed extends beyond, it whips over it on each trip. This unwanted motion spoils tone quality and control. If the reed is placed too far down to reach the level tip, air is lost through the opening. The reed must close airtight on each trip.

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CHAPTER VII

HOW AND WHERE TO PRACTICE

IT is well to practice both while standing and while sitting, since playing in public involves both. They can be alternated at random to minimize fatigue and to accustom the player to quick changes back and forth, which are part of the routine of playing many engagements.

Mechanical fingering problems that require dozens or hundreds of repetitions, can be worked out while walking up and down the room. Reading of new music can usually be done best while seated. As you sit or stand, lean slightly forward of the perpendicular with one foot ahead of the other for balance. This releases the abdominal muscles from any of the work of keeping the torso upright. They are thus instantly available for their principal function in playing—that of propelling the air from the lungs, into the clarinet.

The best conditions for practice are in a room at least fifteen feet square with a ceiling at least eight feet high. The floor should be at least partially carpeted and the walls should not be flat and bare to make an echo. There should be sufficient furniture to deaden vibration without the stifling sensation experienced in some radio studios. Ordinary cotton wrapping string criss-crossed between small

nails on the picture molding stops echo in a room that is too bare. It is a distinct psychological hazard to practice in a room that is too "lively." It flatters the tone to the player and lulls him into a sense of false security. Then when he plays in a public building that is not so resonant his tone seems dead to him and he cannot do his best. Conversely, practice in a room with dead acoustics is a constant challenge to the player to make it sound better. He will actually accomplish this at least in small degree through constant striving. Besides, in much larger degree, he will be delighted and inspired by his own tone in public because of the livelier acoustics.

Chapter VIII

THE FIRST TONE

WHEN the complete clarinet is finally assembled, place the right thumb under the thumb rest on the lower joint and grip the upper joint by placing the left thumb and index finger on holes 1 and 2 respectively. (See Chart, Part II.) To be sure that you cover these holes airtight, press hard for a moment and examine the fleshy pads of the finger tips. A complete circle from the tone hole rim will be visible if the seal was airtight.

Now draw the lower lip in slightly to cover the teeth, *comfortably.* Do not strain or stretch the lip. Now insert the mouthpiece about a half inch in the mouth and let the reed rest on the lower lip. Close the jaw gently until the bare upper teeth rest on the tapered beak of the mouthpiece. Close the lips around reed and mouthpiece like a rubber band—with even pressure. Do not bite hard. Blow gently. If lucky, you will produce the note E, first line of the treble clef (𝄞) staff, which is the only one used by the clarinet. If there is no sound, blow again, this time a little harder. Increase air pressure until it is evident that the fault lies elsewhere. Perhaps you blew too hard the first time. Try less air pressure. Now put the mouthpiece a little farther into the mouth and try various air pressures. If

you still do not produce a sound, withdraw the mouthpiece part way and try again. Try changing the amount of bite with the jaw. The reed may be too soft or too stiff. Try other reeds with all degrees of jaw, lip and air pressure. With all these variable factors conspiring against you it may be several minutes before you produce even a squawk. Be thankful for a squawk. It means that you are on the right track. The second squawk will come more quickly. A few more minutes of experimentation will enable you to produce something approaching a musical tone. You can then vary the monotony by covering the next hole, No. 3, with the left middle (3d) finger. This note is D. Then put the 4th finger on hole No. 4 to produce C. Be content with these three notes for the first practice session. Sustain each one for five seconds or more, many times, to become accustomed to the right amount of jaw, lip and air pressure necessary. This will be a start toward the development of the muscles involved, so that they can perform their new duties certainly and with a minimum of discomfort. In a few days you will be able to tell if your reeds are too soft or too stiff, and you can improve your product by altering them to suit.

The instructions were to put the *bare* upper teeth on the mouthpiece. Most professionals play that way. However there are some who prefer to pad the upper teeth with the lip in the same way that the lower teeth are padded in order to back up the reed properly. Several factors justify the choice of the majority. In the first place the upper teeth are usually so sharp that they cut the lip painfully, especially when playing high notes, which require more bite. Then too, bare teeth grip the mouthpiece more firmly. If both lips are used the mouthpiece dances around considerably when fingers are flying in fast passages, often caus-

ing unnecessary squeaks. Players who use both lips over teeth claim a better tone. Undoubtedly the tone sounds differently and perhaps better *to them,* because the player hears his product largely through bone conduction to his ear rather than through the air as is the case with the listener. The padding of the upper teeth by the lip affects that conduction. But the tone is not noticeably different to others. This can easily be proved by having a group hear a player who is out of sight. The auditors will never be unanimous as to when the player used bare or covered upper teeth. The lower lip must of course be over the teeth at all times to provide an even pad for the reed. A dentist can smooth minute points of the teeth that cause soreness. On hard jobs professionals often cover the teeth with paper or leather to prevent laceration. If the vibrations irritate the bare upper teeth, a small piece of auto tube patch can be stuck on the mouthpiece as a pad, tapered on the sides to a thin edge where the lip crosses, to prevent leakage of air. This rubber pad permits a strong grip and does not harm the tone in any way.

* * * * *

All beginners are bothered by an excess of saliva in the clarinet. As soon as blowing, tonguing and simple fingering are done subconsciously, sufficient attention can be allocated to this disagreeable nuisance to effect a cure. Swallowing frequently is not alone sufficient. There will still remain enough saliva in the front of the mouth to cause trouble as the air forces it ahead. The remedy is to strip the saliva backward with tongue against the roof of the mouth and by cheeks tightened against teeth each time just as you are about to play. A little thoughtful practice will form the habit. There is no need for any saliva to enter

the mouthpiece. The moisture that forms, and that in humid weather drips from the bell is not saliva but merely condensed moisture of the breath. In hot dry weather there is often no condensation visible.

CHAPTER IX

TONGUING

AN absolute beginner has enough to do to discover by trial and error the right amount of lip and air pressure needed to produce a solid sound, as distinguished from the high harmonic squeaks obtained by blowing hard with totally relaxed lips. As soon as he is able to make this solid sound at will (it is imposing on credulity to call it a tone as yet) he will begin to notice a disagreeable "whish" for a fraction of a second before the real sound begins. It is caused by leakage of air through the instrument before the pressure is built up sufficiently to vibrate the reed. This is where the tongue comes to the rescue. From this point on the tone must *always* be started by the tongue acting as a valve to release the air at the proper pressure to vibrate the reed *instantly*. This eliminates the "whish." The technique of tonguing is a knack that some acquire easily, but some people have great difficulty with it. If analyzed and tried slowly, step by step, it is easy, though it may feel awkward and sound crude at first. Refinement and speed come with correct practice that requires will power, for it is monotonous.

This is the proper way to start a tone on the clarinet:

1. Put mouthpiece in mouth.

2. Close lips in playing position.
3. Slide tongue forward in the most natural and comfortable way until it touches tip of reed and mouthpiece. This contact will take place with most people at a spot on top of the tongue about ¼ inch behind the tip. The tongue seals the space between reed and mouthpiece. *Keep it there.*
4. Start the air pressure, using the amount which has been determined by previous practice to be necessary for a tone. There is no sound. The air remains confined under pressure in the mouth and throat. Keep this pressure constant and don't puff out the cheeks. To do so exerts a pull on the lip muscles, upsetting the proper "pucker" for tone control. The conditions now are identical with those of water under pressure in a pipe which is held back by a faucet. When the faucet is turned on the water rushes out at full pressure. So must it be with the air confined in the mouth, throat and lungs of the player. The next step now is:
5. Pronounce the syllable "TUH" or "TOO" into the clarinet, being careful not to move the jaw and thereby spoil reed control. The act of pronouncing TUH causes the tongue to jump back quickly. The air under pressure is released suddenly and a solid *tone* starts instantly with no fuzzy sound before it.

The sole function of the tongue is to act as a valve to start and stop the air, or in other words, to cut off the tone into portions of any desired length. Its motion is always the same and it has nothing to do with pitch or quality. Some beginners have trouble disassociating tongue and jaw, and execute a chewing motion. This changes the length of the free vibrating end of the reed and consequent-

ly the pitch and quality. If the tone is to be the same at its beginning, in the middle and at the end, all muscular control and positions must be the same. There is no more reason for moving the jaw while tonguing than for wiggling the toes while scratching the head. The two motions are completely separate, and must not be combined.

Tonguing is perhaps the least natural of all the motions involved in clarinet playing and therefore requires the most methodical practice. The speed with which detached notes can be played is limited by our physiological makeup to about ten per second, and few professionals can do more than eight in a passage of a dozen or more notes, for the tongue tires quickly. To acquire anything approaching this speed requires hundreds of hours of practice over a period of years. In learning to tongue properly the beginner should bear in mind the old adage "If you want to play fast, practice slowly."

The note E that you first played is excellent for starting tongue practice. It "speaks" easily with a minimum of resistance, and fingering it provides a good grip on the instrument. The ear can be rested by changing to D and C occasionally, but at first don't attempt to synchronize tongue and fingers by changing the note with each stroke of the tongue. Master one physical task at a time. Wait until the tongue acts subconsciously before attempting staccato figures.

When you are reasonably sure of tonguing two or three solid notes per second without having to think about the process, you are ready for the next step. This is *stopping* the tone with the tongue, necessary not only in fast passages, but also in slow passages of very short notes with silence between. To accomplish this say "TUT" into the clarinet instead of "TUH." The final T will return the

tongue to the tip of reed and mouthpiece, stopping the vibration instantly, but with the air still under pressure in mouth and throat. To be sure at first of the proper tongue action, make the U of the syllable at least one second long. Work the tongue violently so that you feel the backward and forward motion. This muscular awareness is essential for eliminating excess or faulty motion. When you are sure of the correct motion at this slow speed gradually shorten the U of the TUT and increase the tension of the tongue so that the interval of time during which the reed is free to vibrate becomes shorter and shorter, until the tongue is away from the reed tip hardly at all. Be careful to maintain the same air pressure constantly except when a new breath is necessary.

The tongue speed should always be the same, the fastest possible, for sharp staccato notes, no matter how much time there is between them. Bear in mind the chicken picking up grain. No matter how scarce the grain and how much time is spent looking for the next bit, the chicken always pecks at it with the same speed of motion as if it were plentiful.

A principal use for the short TUT is when playing passages with pizzicato violins. The tone of the plucked string is perhaps the shortest in all music. It requires a fine reed staccato to match it.

It is difficult to produce one single short TUT tone *musically*. The final T is apt to be too prominent, and a short "bzzt" may be heard if the tongue is a trifle slow in stopping the reed. In group playing this final T is softened and made agreeable by the inevitable, if minute, discrepancy of quality and timing between individuals. This is especially true in a section of clarinets in a concert band.

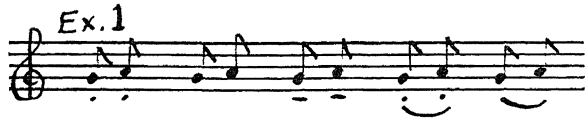
The shortest possible staccato of a clarinet section is very pleasing.

The main need for a short TUT is in rapid passages of notes close together. In this case the final T of each syllable is omitted. Instead of TUT, TUT, TUT, TUT, the tongue pronounces TUTUTUTUTUTUT, etc. Such groups of notes are much easier to produce in a manner pleasing to the ear than are single short notes with space between. In rapid passages all phases of staccato have to be shortened, which increases incisiveness. The speed is helped if the tongue hits violently. This adds a mechanical bounce to the tightly flexed muscle which speeds execution of the mental impulse to withdraw it for the next tone. In a passage such as the fast movement of the William Tell Overture each group of two 16ths and one 8th note can be started by a fine performer at a rate as fast as twelve per second. A fourth note at that rate would be impossible. The 8th note in each group gives the tongue a tiny rest and the opportunity to get set for the next bounce. This is just about the speed limit. It is not attainable by everybody even in groups of two or three notes.

So much for sheer speed. In slower passages there is leeway in the matter of starting and stopping notes, that calls for judgment. A good player can produce a beautiful staccato in a thousand gradations of sharpness, from the physical limit of his reflexes to a mere pulsation in a continuous tone. In this latter case the tongue does not actually meet the tip of reed and mouthpiece, but gets near enough to interrupt partially the flow of air by pronouncing a syllable more like THUH.

Whereas the degrees of staccato are limitless, it is possible to indicate only about five different ones by musical

notation. The range from sharp staccato to a complete legato or slur is written thus:



Gradations between these printed ones are a matter of common sense, artistry and innate musical taste of the player, if alone. In group playing all participants should strive to employe the same degree of staccato.

There is no method of actually measuring the duration of staccato notes and the silent spaces between them. Notes not slurred are all shorter than the time allotted them. The act of tonguing (or in the case of the violin, of bowing) requires time, even though it is only a small fraction of a second. This time must be taken from the end of the preceding note, for each note must start exactly on time. A note with a dote above or below its head, opposite the stem,* must be even shorter than is necessary in allowing for the physical act of attacking the next one. How much shorter it is impossible to compute. In effect the composer uses the dot to say, "Don't hold the note for its full value, but use your own judgment as to how much to shorten it." Some calculation does enter, however. A quarter note with a dot under it is obviously longer than an eighth note with a dot under it that is followed by an eighth rest, and an eighth with a dot under it is longer than a sixteenth note, etc. But there the guidance ends. There is no standard of measurement to say *how much* they should differ.

* The dot *over* or *under* a note head which governs staccato must not be confused with a dot *after* a note which lengthens its value 50%.

The finest symphony conductor can say only "Shorter" or "Not so short." If he is particular, a fine artist may have to try a dozen times to get exactly the degree of staccato he wants. Brass and flute players can *double tongue* and get twice the speed mentioned above, thereby competing with violin players with their alternate up and down bowing. But double tonguing on a clarinet is not really practical. Many can demonstrate it, but they are invariably "dressing room" performers. Often they can do it at only one speed that seems to depend on each man's physical and nervous makeup. That exact speed is seldom encountered in ensemble playing and the feat is therefore seldom practical. It is doubtful if a single first clarinet player in any symphony orchestra today can double tongue for general use in actual daily work.

The principal of double tonguing is simple. It consists of alternating throat notes with tongued notes by pronouncing "KUH" or some similar syllable which occupies the time consumed by the tongue in returning to its original position. This is possible in the flute because only the column of air vibrates, and it stops instantly when the motive power ceases. In the case of brass instruments the lips vibrate, and they are operated by the player's will. But in the clarinet the reed vibrates, and it continues for a fraction of a second after the KUH syllable. An uneven alternation of notes is inevitable. Some players have a little luck with an up-and-down or a side-to-side movement of the tongue across the tips of reed and mouthpiece. Either method doubles speed but results are not good and there is always the danger of splitting the reed.

No harm can come from attempting to perfect a good double tongue on the clarinet. In fact whoever can devise

a really good, practical system that can be taught readily to all will receive the blessing as well as the pay of countless players who continually struggle with staccato passages that are beyond their speed.

CHAPTER X

FIRST FINGER PRACTICE

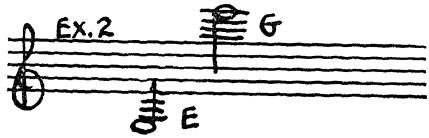
WITH a fairly stable tone and a tongue trained to chop it off in any desired lengths, the beginner is ready to start training his fingers. These two preliminary steps can be acquired sometimes in a total of two or three hours spread over a few days, if reed and mouthpiece happen to be just about right. Some have more difficulty than others with the rather intangible knack of governing lips, tongue and breathing.

Ability to read music is an essential part of finger drill. In this country it is often neglected in the abstract and the pupil is placed in the double jeopardy of learning to read and to play at the same time. Fortunately musical notation is one of the most logical things man has accomplished. The principle of it is easy to understand, and speed in its use can be developed faster than finger speed.

Early music was written on any number of horizontal lines necessary to contain the melody. It was soon discovered that more than seven or eight lines were difficult to distinguish quickly. The method was abandoned and all music played today is written on a *staff* of five lines. Short *added lines* above or below this staff take care of high and low notes. The letters from A to G are used to name the

seven notes in an octave. They are used over and over in the same relative position for all octaves above and below middle C. These letters are in their usual order with notes going upward on the musical page. Hence, descending scales employ them in reverse order. To facilitate reading, pupils should practice reciting these letters backward until it can be done as rapidly and accurately as forward.

To avoid a confusing number of added lines above and below the staff when writing for all instruments, middle C (the north pole of musical navigation, from which all other notes are calculated) is arbitrarily located at various places on or near the staff by means of *Clefs*. It is sufficient to say here that all music for the clarinet is written in the Treble Clef (𝄞), in which middle C is placed on the first added line below the staff. This is the only clef the beginner needs to consider. The whole practical range of the clarinet is written thus:



It is excellent sight reading practice to select any piece of music and to point with a pencil at random to note after note, naming each one as it is indicated. As an aid in fixing note location in the student's mind it has long been the custom to name the lines and spaces of the staff separately. Reading up, the lines E, G, B, D, F are initials of the words in the convenient sentence "Every Good Boy Does Fine." The four spaces are F, A, C, E—easy to remember.

It is obvious that you cannot play a note until you know

what it is. In practice don't play any note merely in the hope it is the right one. *Be sure.* Three steps are involved in playing a note. First: You must *think* what the note is. Second: For the present you must *think* how it is to be fingered. Third: Actually place the fingers. Adopt this method at the beginning and stick to it until it is habit.

Keep fingers slightly bent at all times. If allowed to cover holes or strike keys while completely straight, they may go past the dead center and the end joints will bend backward a trifle. This slows their recovery to the starting position. Muscles are in a better "ready" position if the fingers are slightly bent toward the palm. Also the best pad on the finger tip is forward of the flat position. Easier and better coverage is obtained with the end joints of fingers pointing slightly inward.

Aside from the purely physical movements, the big difficulty is control of nine fingers in all possible combinations. In moving from one note to another it may be necessary to change only one finger. Other note sequences require the raising or lowering of several or all nine simultaneously. The player must know the location of each finger at all times in the same way and for the same reasons that a train dispatcher must know the location of all the trains in his division. This is called *finger consciousness.* Failure of one finger to be exactly on time can result in the wrong note, a squeak, or a blank of no sound at all. In addition to synchronization, it is essential to cut down the transition time from down-to-up, and from up-to-down, for all fingers. This time must be reduced as near to nothing at all as is humanly possible in order to play more notes per second.

At the same time that fingers are being trained to cover holes and to press keys, each note should be pronounced

mentally so that the note on the page is always associated with the note played. If in doubt at any time, *look* at the note, *finger* it and *pronounce* aloud the letter that represents it. This is the best way to learn to play and to read at the same time.

Starting again with first line E, the next step is to go down the scale slowly, seating airtight one finger at a time. The air under pressure of the breath in the tube escapes at the first opening. Therefore as each finger is added, those already seated must stay in position. Cover hole 3 with third finger of left hand to make D; then hole 4 with fourth finger to make C; hole 6 with third finger of right hand for B natural; hole 5 with second finger of right hand to make A; and hole 7 with the fourth finger to produce low G. Now go back to first line E again and remove finger from hole 2, making F, first space of staff. With only the two thumbs in use the clarinet is apt to roll sideways in the mouth. Practice balancing the instrument to cut down this tendency. G is a little worse, with no holes or keys touched. For this reason it is called *open G* and is frequently used in explanations.

Before you experiment with any keys, the fingers should be drilled in the accurate and quick covering of these seven main holes. Start with notes one second long, going up and down the octave between open G and low G *stepwise*—one finger at a time, between adjacent notes. Raise the fingers high and hit them like hammers. This devoleps not only the muscles themselves, but finger accuracy and consciousness. Later on excess motion can be lessened if desired. For the beginner the main problem is accurate, quick action. When sure of the seven fingers singly, try jumps of two notes, requiring two fingers to move simultaneously. Then three-note intervals, and four, etc.

When you are sure of these eight basic notes it is time to begin practice with keys. With the seven finger holes closed, press key 22 with the right little (5th) finger. This makes low F, third line below staff. Now add key 19 with left 5th finger to make low E, the bottom note of the ordinary Boehm clarinet (without the special low E♭ key). Now go back to the top of the instrument. With everything else open, press key 13 with left index (2d) finger. This produces the note A, 2d space of staff. Still pressing key 13, press key 8 with the thumb. This note is B♭ on the middle line of staff. This completes the open range of the first or Chalumeau register of the clarinet.

* * * * *

From this point on you will need a good standard "Method" for subject matter—scales, arpeggios, etudes and duets. The latter are very beneficial. Two beginners will not make the same mistakes or in the same way. Each helps the other in duets, especially if both play the upper line together and then the lower line together at first. This locates mistakes, which are then easily diagnosed and corrected.

CHAPTER XI

LIP PRESSURE

CHANGING the fingers is not alone sufficient to produce different tones of good quality and correct pitch. Lip and jaw pressure must vary with the altitude of the notes played. Very little pressure is required in the bottom register, and the increase necessary from low E to middle line B♭ is relatively small. From that point up the increase is much more rapid, so that by the time high G is reached, fourth line above the staff, the lip tires quickly when producing the required pressure. Higher notes demand quicker vibrations. This is made possible when the reed is clamped by lip and jaw at a corresponding part in the curve of the mouthpiece lay, which shortens its free pendulum. Each one of the 45 notes in the register requires a different length of this free pendulum of the reed. The difference is about ¼ inch from the lowest to the highest note. Lip and jaw must learn to divide this ¼ inch into 45 positions for the best possible results, and they must be able to pass from any one position to any other one as quickly as the fingers change. This is very difficult. It is one of the principal reasons why better intonation is possible in slow passages than in fast work. The beginner, beset with many other problems, cannot hope to make this accurate division,

but he can soon learn to set the approximate pressure for the several "zones" of pitch. The notes in each zone will "speak" with application of this pressure though they may be flat or "sour" if the pressure is a trifle less than it should be, or thin and strident and even sharp if the pressure for an individual note is too great.

It requires time to build lip muscles capable of playing high notes up to pitch. These muscles, like all others, can be developed by daily use to the point of reasonable fatigue. Never force your lip to play after it is so tired it begins to rebel and relax in spite of your efforts to flex it. If you do, you instinctively bite harder with the teeth to maintain the pressure. This interferes with blood circulation and even cuts the tissues. It is not only painful, but it lessens the sensitiveness of the muscle, reducing control. Persisted in for years it can permanently affect the playing results.

CHAPTER XII

ACCIDENTALS—SIGNATURE

THE twelve half steps or *intervals* into which each octave is divided are unevenly distributed among the seven letters used to name the notes of the diatonic scale. Between B and C and between E and F there is the interval of only a half step. Between all the other lettered notes there is twice the distance—two half steps or one whole step, which is one-sixth of an octave. The halfway mark in these wider intervals is indicated by means of *accidentals*—symbols preceding the notes which raise or lower them by a half step. The sharp (♯) raises. The flat (♭) lowers. Sometimes a double sharp (𝄪) is used to raise a note a whole step. A double flat does the opposite—it lowers a note a whole step. There is no separate symbol for this. Two ordinary flat symbols close together are used (♭♭). Any single or double flat or sharp applies to all repetitions of the note it precedes and its octaves, in the remainder of the measure in which it occurs. Accidentals are automatically cancelled by the next bar line. Also a natural sign (♮) cancels any accidental of the note it is attached to, and its octaves, for the remainder of the measure in which it occurs.

Accidentals are for momentary use. To relieve the mind of the continual burden of seeing and interpreting acciden-

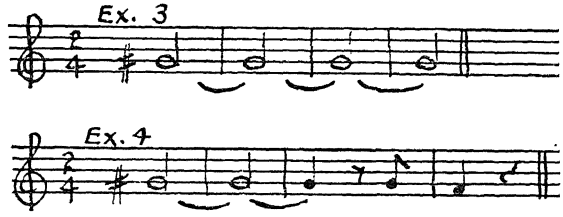
tals when music is written in any other key than C, *key signatures* are employed at the beginning of compositions. A signature consists of one to seven sharps or flats placed immediately after the clef sign at the top of the page. In order, the sharps are always F, C, G, D, A, E, B. The flats are on B, E, A, D, G, C, F. All notes in all octaves in the composition must be sharped or flatted according to the key signature. Thus with one sharp all F's must be sharped. In a key of three flats, all B's, E's and A's must be flatted. The fingers soon learn to react automatically to key signatures, releasing the conscious mind from one burden in playing. The diatonic scale has half steps between the third and fourth and between the seventh and eighth scale steps. In the key of C these half steps occur naturally where they belong. In starting a scale on any other note than C, a specified number of flats or sharps is necessary in the signature in order to put these half-step intervals where they should be.

Stated simply, flats or sharps in a key signature apply throughout the composition until the key is changed. Used as accidentals they apply only for the remainder of the measure in which they occur.

In actual use, publishers frequently print accidentals for different octaves of the same note in the same measure. This is a welcome help to players, but in no way abrogates the rule that an accidental applies equally to all octaves of the same note.

Accidentals carry over bar lines if a note is tied by a *slur* to the same note in succeeding measures. Thus, in Ex. 3 the four half notes are all G♯. In Ex. 4 the eighth note automatically becomes G natural because it is not under the slur. Actually, however, it is customary to print a natural sign before the eighth note. This enables the player to

make the change through eye-to-finger reflexes, instead of compelling him to *think* signature. It is also quite usual to put parentheses around the natural sign, assuring the player that there is no key change, but merely a resumption of the previously announced key. Music is printed or written not to test or try the player, but to help him where possible.



A natural sign placed before the eighth note as in Ex. 4 is helpful in direct proportion to the length of the slurred G♯. If ten or twenty measures are strung together by slurs with only the original ♯ to govern them, it is possible that the player may forget that it is an accidental. His ear will be accustomed to the altered chord by that time and he may think the sharp is in the signature. He would then surely play the final eighth note as G♯ without the parenthetical natural sign to set him right. Seeing this natural, his next reaction would be to glance back to the beginning of the line or the top of the page to remind him of the actual signature.

It is well to note at this time that the standard B♭ clarinet in use all over the world is a *transposing* instrument. All notes mentioned in this book, unless otherwise specified, are the *fingered* notes used on all sizes and pitches of clarinets. The actual sounds, termed *concert* notes, will not be the same as on a piano, but will vary according to the key of the clarinet. In the case of the standard B♭ all *written*

notes sound one whole step lower than *concert* notes. This is why it is called a B♭ clarinet—the fingered C sounds concert B♭. Trying to compare clarinet notes with those of the same name on the piano will be confusing at this early stage. All practice should be alone for a while, or with another student of the instrument of about the same stage of development.

CHAPTER XIII

TAPPING THE FOOT

SOME teachers will not allow pupils to beat time by tapping the foot. This is wrong. During private practice or in group rehearsal, it is very helpful and does no harm in any way. People normally responsive to music can develop a subconscious sense of rhythm in a well trained foot that will hew to the line in spite of nearby distractions. This instinctive rhythm, again, frees the mind for other tasks. It is a compass by which notes of fractional or multiple beats can be charted. A metronome is fine in its way, but much time and concentration are lost in setting it ahead and back for various speeds. If a pupil starts an exercise and finds the speed too great, his friendly foot will slow down instantly the required amount without thought or effort. This flexibility is essential in playing in band or orchestra where the whim of the leader or the demands of the music call for frequent changes of tempo. Players who cannot sense a time change quickly, plunge ahead or lag behind the pack and are forever in trouble.

Obviously a concert group would look ridiculous if all members thumped their feet visibly while playing in public. If after adequate rehearsal, the time scheme of a number is still tricky, it is possible to keep time with the toes with-

out moving the shoes. Most seasoned professional players do this in intricate music. The first violin of one of the world's great string quartets has been seen to tap his foot throughout much of a formal concert. One of the best violin players and teachers of the last generation instructed his pupils to sway head or torso in practice to develop a sense of steadily recurring rhythm in the body. Something tangible is necessary to indicate regular beats when music is complex and the natural accents are obscured by dynamics, syncopation, duple against triple rhythm, etc. Tapping the foot in practice, especially of a new composition, is like a scaffold on a new building—necessary for the formative period, and dispensible when finished.

Chapter XIV

TIME

It is not necessary for the musical system of counting time to bother anybody. Musical notation is one of the most logical things in the world, and a simple explanation should end all mysteries.

The whole note 𝅝, and the whole rest ▬, are the basis for the relative time values in all music. These are divided by twos, successively, to obtain the half note 𝅗𝅥, designated by the addition of a *stem* to the note head, and the half ▬;* the quarter note ♩ and the quarter rest 𝄽; the eighth note ♪ (with one *flag* on the stem) and the eighth rest 𝄾; the 16th 𝅘𝅥𝅯 (two flags) and 𝄿, etc. There are three flags on the stems of 32d notes and rests, four for 64ths, etc. These subdivisions determine the *relative* value (never the *absolute* value or duration in time as measured by a clock) of the various notes and rests in a musical composition.

A dot placed after a note or rest increases its value by

* The whole rest is a heavy horizontal line about ⅛ inch long that is placed under and attached to the fourth line of the staff. The half rest is an identical short heavy line above and attached to the middle line. Actually the two are often reversed through carelessness in printing and in hand copying. It makes no difference, however, for with a little experience in reading music, the mind readily grasps the intent of the composer in computing the total content of a measure. It will reject an error of so much as a half rest.

50%. Thus, if a whole note is to get four beats, a dotted whole note will get six beats.

If a 𝅗𝅥 is to get 2 beats, a 𝅗𝅥. will get 3
If a ♩ is to get 1 beat, a ♩. will get 1½
If a ♪ is to get ½ beat, a ♪. will get ¾
If a 𝅘𝅥𝅯 is to get ¼ beat, a 𝅘𝅥𝅯. will get ⅜, etc.

The increase is always proportionate. Thus, if a whole note gets two beats, a dotted whole note will get three, while a dotted half note at the same speed will get 1½ beats, etc.

Notes are often double dotted 𝅗𝅥.., and occasionally three dots are used 𝅗𝅥... The same rule applies. Each dot adds 50% to whatever precedes it. If a half note gets two beats, the first dot is worth one beat, the second dot a half beat and the third dot is worth one-fourth of a beat. This triple dotted note is therefore worth 3¾ beats.

Schumann has even used four dots. In the Adagio movement of his String Quartet Opus 41, No. 1 he uses several half notes, each with four dots. It is 4/4 Common time. Several measures contain only one quadruple dotted half note and one 32d note. The four dots give the half note a total of 3⅞ beats, leaving the last eighth of the fourth beat for the 32d note. This is an extreme case.

The number of beats per minute is a totally different matter. It is here that most learners are misinformed. Normal human beings *feel* regularly recurring accents called *rhythm.* It is a normal impulse to tap the foot, move hand or finger or sway the body in time with those accents which are at a speed which is physically comfortable, and mentally, easily perceptible. On this basis a player with his foot, or a leader with his baton, *beats time,* giving one beat to a half note, a quarter note, or to any other kind of note which has been chosen as the *standard of value* for

the particular piece of music at hand. This standard of value makes possible the computation of the actual time value (duration) of all the notes and rests *in terms of beats.* The leader beats time with his stick to enable the players in a group to stay together. Not only must those playing the melody be in exact unison, but the various notes of a chord must change at the same instant to the notes of another chord. If one chord does not thus *resolve* into the next one as it should, the hangover notes will clash and produce a discord.

The *rapidity* of a leader's beats must be confined to a rather narrow choice of time intervals in order to be of any use to players. If he beats too fast his flailing arms are a blur and of little help to a player whose principal attention and eyesight are centered on the music page. If he beats too slowly the players in a group will subdivide these slow beats differently because of individual physical makeup and because of different inherent response to the music itself. This will prevent them from playing short notes together. The ideal rate of beat is probably about 120 or 130 per minute, corresponding to army marching tempo. Most people feel a rhythm at this speed, and subdividing these beats for shorter notes (which can be 2, 3, 4, 6, 8, 12, etc., per beat) is a simple matter of arithmetic.

Probably more music is written in 4/4 than in any other time. The figures 4/4 do not mean that the music must be played four beats to the measure. They mean only that there must be four fourth (quarter) notes or something equal to four quarter notes in each measure. There can be one whole note, two half notes, one half note and two quarter rests or any other combination of fractional notes or rests or both that add up to exactly four quarters in each measure. It is just like making change of a dollar. The same

system prevails in any other time signature. In 6/8 time there must be six eighth notes or their equivalent in each measure. 2/4 must have two quarters per measure. 9/8 and 12/8 are just what the figures indicate; there must be nine eighths and twelve eighths, respectively, in each measure.

The time signature has nothing to do with the *speed* at which a composition should be played. The speed will vary for the same piece, with different players and leaders, and with the use to which the music is put. The number of beats per minute must remain fairly constant if the leader is to convey his meaning to the players. Therefore he *selects* the kind of note as his standard of value which can receive one beat at a rate understandable by the players. He can select anything from a whole note down to a thirty-second if the occasion demands. Only after a leader announces his standard of value can the players compute the absolute value (duration) in terms of beats of the notes they are to play.

The best illustration of the above is found in the Fox Trot, which may be called the generic name of all modern 4/4 dance tunes. They are all scored in 4/4 time and most of them are played two beats per measure—a half note being the standard of value. 4/4 is called *common time* and is often indicated by a large capital C instead of by the figures. If it is to be played two beats per measure there is a line through the C (¢) and the tempo is usually called Allo Breve or just "cut time." Many band marches are written this way.

Many compositions of early writers in 4/4 time must be played "in 8"—8 beats per measure. This makes the eighth note the standard of value which receives one beat.

2/4 marches, one steps and circus gallops often are whipped up so fast that a leader could not swing his arms

twice in a measure. So he beats "in one," meaning that he indicates only the down beat.

6/8 marches are always played two beats per measure. There must be six eighth notes, or something equal thereto, in each measure. So at two beats per measure there must be three eighth notes per beat. This is called a *triple rhythm,* as distinct from *duple* wherein the subdivision is by twos. To get the standard of value we must therefore employ a dotted note. A dotted quarter equals three eighth notes. Therefore it gets one beat in 6/8 time played two beats per measure. 9/8 time is usually played three beats per measure and 12/8 four per measure. A dotted quarter gets one beat in each case.

Ballads, andantes, etc., in 6/8, 9/8 and 12/8 are often played so slowly that a full beat must be given to an eighth note. In such a case the leader announces that he will beat "in six," "in nine," or "in twelve."

Any speed is permissible as long as the relative values of the different notes are maintained. Selection of the speed to be used is up to the leader, and he is guided by the character of the music itself, or by the demands of the soloist or dancer if the group is playing an accompaniment.

Holding a note for any desired multiple of a beat is easy. Mental counting while playing is feasible. The leader's beat should clearly indicate bar lines. If a note is sustained for several measures, keeping track of the down beats is not hard. If the leader beats in circles or makes motions as though he were fighting a swarm of bees, you can make your own down beats with the toes or heel, without disturbing auditors. With a slight motion of the knee to the right you can indicate for yourself the second beat in triple rhythm. With left and right motions you can indicate second and third beats in four-to-the-bar. In each case a slight raising of the heel marks the last beat of the measure and

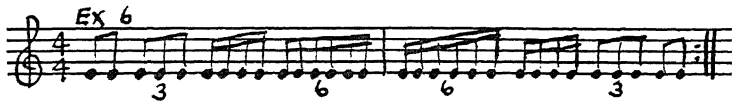
prepares for the down beat of the next one. This leg and heel motion can be so slight as to be imperceptible to the audience, and still be a very definite guide to the player.

Allotting proper time for notes to be held a fraction of a beat is not so easy. The favorite method of halving beats is by saying "one and, two and, three and, four," etc. For triple division of a beat, any easy syllables can be used, such as "one and a, two and a." For rapid fours the ear must listen for the even patter of notes in mathematical precision. Sextoles (six notes per beat) can also be recognized by the ear after a little practice.

To be sure of subdivisions, break down the problem to first principles. Again take first line E. Tap the foot vigorously in steady rhythm at march tempo and play two notes per beat, one on the beat and one on the "and" as the foot rises. When sure of this try triplets. Make the rise of the foot less vigorous so the mind is not aware of the halfway time mark. Tongue three notes to each foot beat. For four notes per beat, slow down the foot as necessary, and use vigorous up and down beats, playing two notes at even intervals for each.

Sextoles are a little harder. The group must not be divided in the middle for that would make merely a pair of triplets. The sextole must be accented in three main subdivisions instead of two. Practice pronouncing **1**, 2, 3, 4, **5**, 6, over and over, accenting 1 and 5 as you say them. This will prevent any natural tendency to divide into two sets of triplets. When you can *talk* these accents, try *playing* them, again with first line E. When you can do this readily make simple exercises like the following:

Having mastered singly these four main subdivisions of a beat, the next step is to be able to change instantly from one to another. Beat the foot or set the metronome and try this:



Then mix the groups in all possible sequences, i. e. from 2 to 6 to 3 to 4 to 2, etc.

Precision is essential for clean ensemble playing where other instruments use identical mixed time patterns. Accuracy is even more necessary for your own sake where different subdivisions are in use at the same time by different instruments or groups. In this case you must go it alone and not listen to those around you. You must rely on your own developed sense of beat subdivision to bring you to the end at the correct time. If you are playing two's or four's and listen to someone playing triplets you can easily be led to play your own notes as triplets, and you will lose your place entirely. Or you might easily decide to go along with someone and discover that he was wrong. Pianists frequently have groups of opposing rhythms for the two hands. At least they have the power to govern both and keep them together. Orchestra players are not so lucky. They can only plot their course and make it flexible to accommodate inequalities in the playing of others. It is excellent training to learn to beat two even beats with one hand and three even beats with the other at the same time that the foot is beating once. The system is easy. Without using the clarinet, count up to six over and over and tap the foot each time you pronounce "one." At the same time tap one hand on the table on one and four, and tap the other hand on one, three and five. This brings the foot and

both hands together on one, and divides the intervening time into two and three equal parts, respectively. Then reverse the hands so that each can make the duple and triple division with equal facility.

Violin and cello players have special exercises to develop the feeling for "two against three." With two fingers on one string they play two alternate notes per beat, over and over. At the same time they play two other alternate notes, over and over, as triplets with the other two fingers on another string. Such an exercise is of course impossible on one clarinet, but it can be done by one man on two clarinets at the same time, using the same idea. One hand can play middle C and first-line E on one clarinet, while the other hand on the other clarinet plays the same E and open G. The bell of the clarinet playing the latter figure must be rested on a table because there is no finger support while playing open G. Blowing two clarinets at the same time in the middle register is easy. But playing the two conflicting rhythms in correct time is a very difficult stunt.

Much harder to do is 3 against 4 at the same time. The count must go to twelve in each cycle, again with the foot beating only on one. One hand must tap the table on 1, 5 and 9 to divide the time into three equal parts. The other hand must tap on 1, 4, 7 and 10 to divide into four equal intervals. If done carefully and exactly, repetition will instil a simultaneous sense of the two rhythms. This will aid greatly in ensemble playing. Here is a diagram of the system: R = right hand
L = left hand

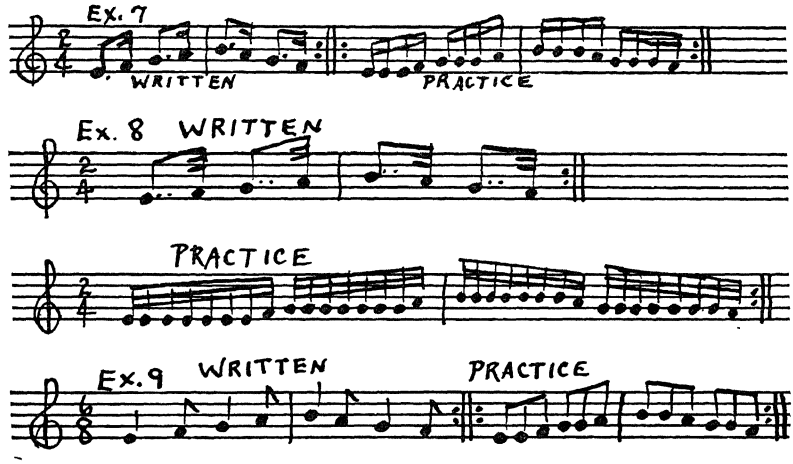
2 against 3

RL		R	L	R		
1	2	3	4	5	6	
Foot						

3 against 4

RL			R	L		R		L	R		
1	2	3	4	5	6	7	8	9	10	11	12
Foot											

Dotted notes occupying less than one beat of time are hard to calculate, because the leader cannot subdivide his beat for visual guidance. In order to calculate 3/4, 3/8, or occasionally in very fast groups, 3/16 of a beat, the time allotted for each group of two notes—a dotted one followed by a shorter note—must be broken up mentally into four even parts as you would make change of a dollar. Three of these small parts of time are then given to the dotted note. The fourth part of time is given to the complementary short note, an 8th, 16th, or 32d, or in extreme cases a 64th note. Examples 7 and 8 are excellent for practicing this time subdivision. All scales and arpeggios can be used also for dotted-note practice.



Quarter and eighth note groups in 6/8 time can also cause trouble. Only by playing all 16th notes in Ex. 7, all

32ds in Ex. 8 and all 8th notes in Ex. 9 can you be sure of proper spacing of all notes. When you are sure of these simple examples, start combining these short notes, one group at a time, retaining other groups in their separated staccato form for comparison. A difference of 1/20th of a second between individual conceptions of these short notes is noticeable and irritating to the listener. Daily work on such passages is fine practice for the tongue, and for co-ordination of tongue and fingers, in addition to the mental drill in sensing and allocating time values.

Often a composer does not use a certain instrument for many measures at a time. This is indicated by a heavy black horizontal line between two bar lines with a figure above it showing the number of measures the instrument is to remain silent. In symphonies rests of 100 measures or more are quite common. It is an ordeal to keep track of these silent measures. Many players will vouch that rests are more difficult to play than are notes. The usual practice is to count on the fingers, using the right hand for digits and the left hand for tens until 100 is reached. The hundreds are so far apart they do not confuse. In a really good orchestra one big hazard to a man while counting is the spell of the music itself. If he relaxes and listens for enjoyment he may forget to count. Or, if he looks away from the page he may think about something else and get lost. Experience soon enables a person to count measures subconsciously, but there is no mechanism in the subconscious mind to warn when to stop. Players absorbed in counting frequently forget their goal and count many more measures than they should, returning to the page too late.

The alert player is guided by a number of factors to ease the mental drudgery of counting long rests. These are a change of key or time signature, a fermata, a cadenza, a

luft pausa, a fortissimo or a pianissimo, and many other departures from uniformity in the musical structure. At rehearsal a player can pencil on his part these noticeable landmarks and thereby reduce his labor and make more sure of his own place. In organized symphony orchestras the counting of measures is at a minimum, players relying on the entrances of their colleagues to plot their own. Occasionally even a fine artist will come in too soon or too late and upset a whole chain of entrances of other players who were relying on him. To be sure, do your own counting always. If you do it correctly the leader will have no reason for censure no matter how many others come in wrong.

Getting lost while playing is a hazard common to all tyros. Finding the place again is a trick with several solutions. If you have a sense of absolute pitch you can judge the key the group is playing in and find the corresponding key in your own part. Even without absolute pitch, a modulation or change of key can be detected by ear, and the accidentals that make it can be caught by the eye. This will narrow your search to a smaller part of the page. The time scheme, whether duple or triple, is easily recognized. Compound rhythms such as 6/8, 9/8, and 12/8 are usually distinguishable from simple triple time by the strong natural accents on the fourth, seventh or tenth 8th note in the measure. If the leader knows his business he will make only one down beat per measure and it will always be the first motion in the measure. His motions between these down beats will indicate how many beats there are in a measure, in case your ear cannot recognize the time scheme. Syncopation sometimes obscures the time pattern to the extent of sounding like a different one, rather than merely a suspended accent of the written time. Note patterns are usually repeated in the various sections of instruments. Listen, and

examine your page, for some prominent group of 16th notes, or alternating dotted and short notes or any other conspicuous pattern.

When you think you have located the right place, "sneak" in softly. If you are wrong, quit instantly and try again elsewhere. Don't break in heavily and stick to it.

CHAPTER XV

SYNCOPATION

THE act of *attacking* a note (starting it) emphasizes it, whether it be by a violin bow or by the tongue of a wind player. In natural rhythms, notes on beats, especially the strong first beat of each measure, are attacked after preceding notes have been stopped. The attack strengthens the natural inherent accent. Conversely, if a note on a strong beat is slurred into from the preceding note which was attacked, the natural accent is obscured. This is syncopation. It must be played very exactly or its charm is lost, and usually the players with it. To do this there must be some means of keeping beats in mind. In a group there is the rigid beat of the leader. Piano and string players and drummers can count the beats loudly enough to help themselves and yet not disturb others. Wind players must rely on tapping the foot or swaying the head or body.

Learning syncopation is not necessarily an ordeal if it is started slowly and analyzed measure by measure. Some pupils have trouble starting notes off the beat because beginner exercises are in the simplest form involving quarter notes and their multiples—halves and wholes—all of which start on beats. It has become habit to beat the foot at the start of each note or to hold notes for two, three or four

complete beats. In simple syncopation notes must be attacked while the foot is in the air. In case of trouble with this new coordination of muscles, beat the foot strongly and raise it with equal vigor, saying "down, up, down, up" as you do it. When you are sure of this, play first line E and start the foot again. Tongue the note each time the foot comes up and hold the note past the down beat. As you play *think* the words "foot, tongue, foot, tongue." If correct, what you play would be written thus:

The second beat in each measure comes in the middle of the quarter note. This will establish the knack of disassociating notes and beats, so that they can be combined at will in any sequence and ratio.

Syncopation in 16th and 32d notes is merely a faster use of this principle. To acquire it, gradually speed up your original Ex. 10 until the foot has trouble beating so fast, then eliminate the second beat of each measure without changing the notes in any way. When sure of this, the speed can be increased again and alternate beats can again be eliminated so that there is only one beat for each two measures. Your eighth notes will then be the same duration as 32ds are when a quarter note is given one full beat.

With this as a foundation, all syncopation can be computed and played. When in doubt go slowly, and increase the speed as the pattern becomes clear in your mind.

Chapter XVI

FIRST ENSEMBLE PLAYING

TO be of some real use to a group such as a high school band you should be able to play the simple major scales and arpeggios in the seven easiest keys—C, and in one, two and three sharps and flats. You should also be able to play their relative minor scales and arpeggios—all at a speed of three or four notes per second and with reasonable freedom from mistakes. You should have a lip strong enough to play in tune up to at least G, the space above the staff, and your tongue should be able to start and stop notes as subconsciously as it forms words. With this technical foundation you can play most of the notes in simple marches after a few tries.

Let us suppose that your first attempt is with a high school band. The clarinets are usually to the leader's left. You will have a partner and both will read from one music stand. The "outside man" (nearest the audience) is section boss. His partner, the "inside man," turns the pages whenever necessary. Were it not for this rigid rule both might try to turn at the same time and neither would play. If several stands of clarinets were to do the same thing at the same time there would be no clarinet section for a few notes or a few measures. Even with good teamwork the section

is noticeably weakened for a time when several stands have to turn at once. With experienced players the turning is staggered, one stand after another, as much as is possible in familiar music. Each man can also play louder while his partner is turning to minimize the weakness. If you turn, stop playing a few measures before the bottom of the page, take hold of the lower right hand corner and be sure your hand and arm do not obscure the view of your partner. When he is sure he has the last few notes in mind he will nod, or waggle the end of his clarinet. This is your signal to turn quickly so that the continuity of his playing is not broken. If an important passage is broken at the bottom of a page, it is sometimes better if the top corner is turned down in advance so that the player can read ahead on the new page while still playing on the old one. When he is safely started on the new page it can be slid over evenly without disturbing him. When the turn is complete resume playing at once to strengthen the section, but start softly to avoid undue emphasis.

If the parts are printed *divisi* (different notes for the two players) it often happens that the outside man has notes that require the use of only one hand. In this case he should turn and play at the same time, thereby avoiding a weak spot. Since the outside man seldom turns, the word "Turn" should be written *above* the staff a few measures before the end of the line as a reminder. All instructions for the second or inside man on the stand are written *below* the staff. If both players are using both hands, one can sometimes play his part up or down an octave to release one hand for turning. In musical show parts it is customary to write the last few measures at the bottom of the right hand page in the margin at the top of the new page, or

vice versa—a few measures of the new page at the bottom of the old one. This enables one man to read ahead and to plan for what is coming. All musicians "keep their eyes ahead of their fingers," just as a person reading aloud from a book reads ahead of the actual pronunciation. A fraction of a second is required to translate a spot on the page into a played note. Music copyists are notoriously lax in spacing manuscript so that pages can be turned without missing notes. Printed music is much more carefully spaced. Rests are placed at the bottom of pages wherever possible so the player can play all notes calmly without the worry of a quick turn. But this leads to another complication. Suppose the page ends with a rest of 17 measures of "three-in-a-bar." The player turns and begins counting **1**, 2, 3; **2**, 2, 3; **3**, 2, 3, etc. It is enough for the mind to keep count of the beats per measure plus the number of measures played. In addition to these two arithmetical processes, to keep the goal—17 measures—also in mind, is asking a good deal. The remedy is simple. In the margin at the top of the new page it is customary to write the figure 17 over a line about a half inch long. Both should be diagonal and of a different size from all printed symbols to show instantly that the notation is explanatory and does not add to the total of the material in the composition. This eliminates one thought process. It is then easy to keep counting to **16**, 2, 3; **17**, 2, 3, and to realize by reflexes through the eyes that the rest is over and that it is time to start playing again. If the new page begins with such a rest while the old page before it has notes right down to the end, the word "Time" should be written at the bottom. This indicates that all notes can be played, that there will be plenty of time for turning before the first notes on the

next page will be due. With careful planning, ingenuity and correct marking, very few important notes need be lost in turning pages.

Have your clarinet assembled and warmed ready to play before the leader raps for attention. Clarinets are flat when cold. The pitch varies one-half step with about 60 degrees of temperature. Your reed should be the best you can find so it will not need any tinkering. This will eliminate one distraction. As the leader raps for silence, *be silent.* There must be teamwork, and the leader is the quarterback who calls the signals.

Your first number is a march, and your part will be labelled "2d and 3d Clarinets." If there are double notes (divisi) the inside man usually plays the lower ones and the outside man the uppers. Sometimes, differing with publishers, better balance of chords is achieved if both players on some stands play the upper notes and both players on other stands play the lower ones. This is for the leader to decide.

The rule for individual practice is always to play everything so slowly that you can play it exactly, increasing the speed gradually as you acquire proficiency, and reducing speed whenever you stumble. "If you want to play fast, practice slowly." Group playing calls for a different system. The first requirement is to stay together. You must walk lockstep, so to speak, with the people around you. To do this you must play at a speed selected by someone else, which is often faster than you can read or finger some of the notes on the page before you. For the first time you must learn to skim over or to simplify difficult groups of notes. This is perhaps the chief difference between individual and group playing. Determining what to play and

what to leave out in such a case calls for thought and judgment and emphasizes the need for good subconscious control of the instrument itself.

It is an axiom in music that at first a person cannot play as much or as well in a group as he can alone. This trait pursues some professionals throughout their careers. These unfortunates are dubbed "dressing room soloists" because they play so much and so fast while warming up, either for the purpose of impressing others or to bolster their own faith in themselves. Others develop into what baseball calls "money players." Audiences stimulate them and they play at their best in public. The inability to play as well at first in a group is easily understandable, for the surroundings and conditions are totally strange. Man is a creature of habit, and the habit of playing with others must be established. The sounds you produce will be blended with and obscured by others. You can govern your output only by careful application of what you have learned—right amount of pressure of jaw, lips and air, and correct finger positions. About the only way to check up on your product is to lean over occasionally and listen to the rebound of your tone from the floor, from your music stand or from the back of the person in front of you, for a second or two. You can also get some idea of your relative loudness by alternately playing and remaining silent for a few measures at a time. A good rule of ensemble playing is: "If you can't hear the melody, you are playing your own part too loudly." In a band this usually applies to the whole section, or to just the seconds and thirds if the solo clarinets have melody.

If your clarinet is sharp with the group you must pull out the mouthpiece or barrel for 1/16th inch or so, and relax your lip for some particular tones in order to meet

the pitch. If you are flat you must pinch the reed more tightly, or perhaps use a shorter than standard barrel. (Chapter XXIV discusses this in detail.)

You may decide that a certain passage is "your dish" and you play it loudly so you can hear it above the din of the others. Maybe the leader thinks some other part is more important and asks you to pipe down.

You may be distracted by drum beats, especially if they are in a time pattern different from that of your own. You may think that what someone else is playing *sounds* like your part *looks*. If you "jump in" you may find that the other fellow is playing 8th notes whereas your part contains quarters, or vice versa. Many other factors can contribute to your complete confusion on your first few attempts to play in the band.

For a march the leader will say "in two" or "two in a bar." This means that he will beat twice in each measure at a fixed rate of speed which he selects, usually from 115 to 140 per minute. He will beat down on 1 and up on 2. If the music starts on the down beat, the leader usually says "On the nose" or merely points to his nose as inconspicuously as possible if the audience is nearby. This means that the first note is to be played with his first beat. This is easy. However, many pieces of music, including marches, begin with one or more *pickup* notes before the first bar line and its accented beat. The methods for starting such a piece differ with the number of these pickup notes. If there is only one it is easy to play it just ahead of the first down beat, especially if the leader is careful to time his preparatory up beat in relation to the first beat of the composition at exactly the speed he desires for the piece. His instructions are usually expressed by the words "Pick it up."

Several pickup notes call for a different procedure, usu-

ally, because players anticipate the leader's tempo differently, and the notes would not be together. It is customary for the leader to say "Full measure" or "A beat for nothing." He will then beat 1 and 2 in advance of the first bar line. This establishes his *tempo* (speed), enabling the players to allot the proper time for the several pickup notes. Thus they can come in together on the first printed down beat in exact rhythm.

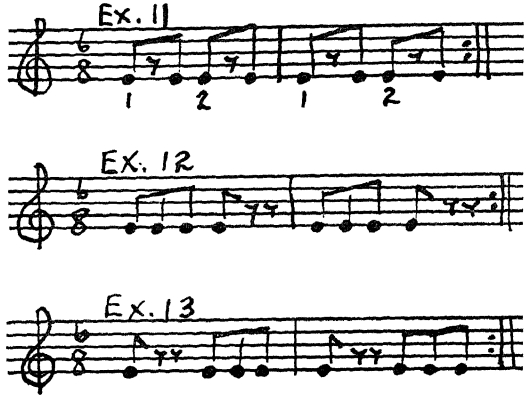
You may get lost in the very first measure. Remember the fate of Mrs. Lot and *don't look back.* Keep track of the time and wait for the down beat of the second measure. Play the note on that down beat. If still in trouble be content for a while with just the first note in each measure. This will begin to put you at ease and enable you to fit into your new surroundings. Remember that there is no way to correct a mistake once it has been made. The old maxim is: "If you can't play everything on the page, DON'T play anything NOT on the page." Leave out as many notes as you have to, but be sure that the ones you do play are the right ones at the right time. Beat your foot and pronounce to yourself 1—2, 1—2, etc. When you are sure of the first note in each measure, begin to play the first note of each beat, i. e. two notes per measure, each in time with your foot. You will encounter some beats that commence with rests instead of with notes. Be sure you do not play on these rests. That is the worst sin in music. Wrong notes can often be philanthropically pardoned on the basis of technical difficulty, but there is no alibi for a note played where a rest should be. A good natured director can occasionally dismiss a note on a rest with "We don't pay extra for overtime" or some other humorous expression, but on the second or third repetition he will not be funny.

Gradually you can add the small notes between beats, but the instant the speed is too much for you, stop playing and

come in again only when you are sure you are right. Don't spoil anything by playing "the right note at the wrong time." Such a note is a wrong one.

Playing the short notes between beats requires two kinds of subdivision. Perhaps the "4/4 Allo Breve" time is the simpler of the two. The half note is the standard of value. There are two quarters or four eighths per beat. By the simple process of "1 and 2 and" the smaller notes will fall into the pattern.

The 6/8 march is a little more complex. There are three eighth notes per beat and the standard of value is therefore the dotted quarter. The leader's second beat falls on the fourth eighth in each measure. When you can play accurately the first and fourth eighth notes, it is usually best next to start playing the third and sixth eighths, still omitting the second and fourth, before attempting measures of solid eighths. A little private practice in this rhythm is essential, at a tempo so slow that you are sure you are correct. Examples 11, 12 and 13 will be very helpful if started slowly and repeated many times, at a gradually faster tempo. Tap the floor and think 1—2, 1—2 all the time.



These special exercises will fix the 6/8 time pattern in your mind and enable you to play marches up to the limit of your finger technic.

* * * * *

It sometimes happens that the bass drum and the tubas will see-saw the time. In trying to bring them together the leader may even have a third version. Whenever anything like this happens, stop playing at once. If almost everybody stops, eventually there will be so few playing that they can get together easily. As soon as they achieve unanimity it is easy to "jump in" with your part with them. Others can do the same and the break in the time need occupy only a few seconds. These occurrences are by no means rare. Bands are even known to start playing two different marches at once, due to faulty passing along of the words of the leader under the excitement of the football game or similar function. The same remedy should be used. If almost everybody stops as soon as the trouble is apparent (and that should be in 2 or 3 seconds) all can resume on the same piece quickly. The "I'm right" attitude translated into louder and louder playing to try to coerce your neighbors into line does not work out. It merely increases the pandemonium.

When you are able to play both kinds of marches, most of the strangeness of group playing will have been dissipated, and it is then only a matter of adding to your proficiency and of learning the finer points of teamwork. Eventually you will be ready to move into the solo clarinet section. You will play more melody and you will be in a higher register most of the time. Often a slightly stiffer reed is required for these high notes.

* * * * *

High school orchestral playing differs from band in several ways. The sounds around you are different in quality due to the strings. Amateur violinists have trouble playing in tune. This makes difficult your task of judging your own intonation and that of the wind players with you. The parts you play will differ greatly from band parts. In band, clarinets take the place of the strings in orchestra, and as many are used as necessary to balance the tonal "weight" of the brass. In orchestra there are usually only one first and one second clarinet. You will play your part alone most of the time and you have only your own judgment to rely on for keeping your place, for intonation, for blending with others, etc. Many band teachers wisely have two firsts and two seconds. It helps with page turning, and minimizes mistakes, since two people will seldom make the same error in the same way.

There will be a number of parts written to be played on the A clarinet. You must either have one or you must transpose each note a half step lower than written if you play the part on the B♭ clarinet. This is difficult and requires technical agility in all keys up to six sharps, for most A clarinet parts are written for the purpose of eliminating the sharps encountered on the B♭ instrument. Even with fingers adequately trained, transposition requires skilled mental processes that come only with long practice. All professional players have to do some transposition. This subject is treated in a special chapter in Part III.

In either band or orchestra, one ever-present difficulty is keeping in mind key signature. Accidentals of a temporary modulation shift mind and ear to a new key. When these accidentals are cancelled by a bar line or other accidentals, the impression of the original key is destroyed, or so obscured in the mind that a quick glance back to the begin-

ning of the line or top of page is necessary to re-establish its identity. Good printed music has the key signature at the start of each line. Copyists, in their urge to save labor, usually write the signature only at the top of each page of manuscript, or at each key change. This is very confusing where key changes are frequent. It is to the player's advantage to write in the key signature on each line. It will prevent the playing of many wrong notes.

Chapter XVII

DEPORTMENT IN PUBLIC

IN a concert on a stage or platform all participants are under the close scrutiny of the audience. Behavior should be within reason at all times. You should sit upright with both feet on the floor. The stand should be so placed that both who use it can see the leader at the same time. There should be no talking, gum chewing, laughter or yawning. Pages should be turned with as little visible effort as possible, and quietly. A microphone magnifies the sound of rustling paper into a roar like breakers on a beach.

Everybody makes mistakes. The perpetrator usually suffers more than the audience. It is very bad manners to look around at the man who has just squeaked, or made a wrong entrance, or played a wrong note. If you do it you can expect others to call attention to your mistakes. You will find it embarrassing. Many mistakes which seem glaring to fellow players are hardly or not at all noticeable to average listeners. Any commotion among the players is distracting to the audience. Looking around at an unfortunate colleague who has just "knocked a foul ball" can disturb them much more than the mistake.

If you must cough or sneeze, do it as quietly as you can. In radio studios it is customary to turn away from the

microphone and to cough in the opposite direction, cushioning the sound in the crook of the elbow. On the concert platform it is well to duck down out of sight behind the music stand. Sight and sound are thus lessened for the audience.

PART II

TECHNICAL MASTERY OF THE CLARINET

INTRODUCTION

MOST people are so eager for the fun and thrill of ensemble playing that they try it too soon. If a player is hopelessly outclassed in a group he may receive a psychological setback that will undermine his belief in his own possibilities. He may also be humiliated before others by a leader who is zealously guarding the group product, which is what he is there for. Even if he "gets by," a pupil with genuine ambition and talent will soon tire of the limited pleasure of playing with the average amateur organization. He will resent the mistakes he makes. He will be chagrined at groups of notes that are too fast for his fingers or for his ability to read. Every difficult spot is a challenge. He will be irked that he cannot accept many of these challenges because of physical ineptitude. But more important, if it sounds good to him momentarily, he will be aware of the elementary calibre of the music that makes such seeming proficiency possible. A true student will want to play better music. Anybody can get a few short-lived thrills from participating in easy music. Only a competent technician can know the joy of playing good music with good musicians.

Physical control of the clarinet necessary to handle the most difficult music wherever encountered requires several thousand hours of carefully guided effort. Some muscles must learn to do things never intended by nature. Others must acquire speed, precision and coordination greater than that required for most other activities. All practice must be supervised by a mind alerted to discover inherent or acquired faults, and to prescribe remedies. As in medicine, the first step is diagnosis, after which the cure is sometimes not so hard to find and administer. One must find out

why the lip does not change tension as quickly as it should for proper pitch in a wide-interval jump; or why the tone is fuzzy or jerky instead of clear and as smooth as a ribbon; and which finger is slow in a shift, and why. Having found out why, each student can make his own exercises for correction. Just blowing through the stick and wiggling the fingers without a plan while staring out the window is not practice. It is time wasted.

Physically, the act of playing breaks down into the three main divisions: tone, staccato and fingering. Each must be given daily attention by methodical setting up exercises in advance of the musical study of the instrument. Practice should start with sustained tones. After ten or fifteen minutes the reed is moistened through and the muscles of face and throat are warmed up for their best work. Staccato practice is next. Then the fingers are due for a workout on calisthenics that in themselves have little bearing on actual music. At the end of a half hour the separate mechanics of playing will be ready for the serious musical study of the instrument. These three main divisions deserve separate chapters.

Chapter XVIII

TONE PRODUCTION—BREATHING

ONE beautiful sustained tone is music. Many notes, though they are played evenly and in tune, are not music if the tone is disagreeable. To have a good tone you must practice tone, without anything else to divert your mind.

The tone is produced by the reed, but it is influenced and governed by several factors. In addition to the length and curve of the lay, these factors include: the depth and shape of the tone chamber in the mouthpiece which is located just under the reed, and the shape and size of mouth and throat of the player. Combined, they are the resonators for the reed as the violin is for the strings. Different players will not produce the same quality tone with the same reed and mouthpiece.

The clarinet uses little air, so never take a full breath as you do for a stay under water. With a good mouthpiece and reed you need not breathe more violently than while walking. The difference is that, while playing, your breathing cannot be so regular. Often you must play on one breath a phrase lasting ten or fifteen seconds. At the end of such a phrase you need a few quick puffs to regain the oxygen the body was denied. But there was no violent exertion as in running, so the shortage is not great and is quickly relieved.

Thus there is never any need to crowd the lungs full of air just before playing. Frequently the problem is to empty the lungs quickly to make room for a new breath between phrases. A good tone is produced by the smooth propulsion of the air through the instrument at varying pressures for pianissimo, fortissimo, crescendo and diminuendo—against the resistance of the limited opening at the mouthpiece tip.

For best quality the tension of lips and jaw should remain constant. To relax them and allow air to hiss out of the corners of the mouth impairs the tone, and the hiss of the air itself can be disagreeable to nearby listeners. But occasionally it has to be done, since the clarinet does not use air as fast as the body does. When there is insufficient time between notes both to exhale used air and to inhale a fresh supply, exhalation must be hastened from the corners of the mouth while playing. With the lungs empty, a quick breath can then be gasped in, as when in swimming. Extended staccato passages are especially difficult to breathe, for the notes are so short they use very little air. A good plan is to exhale after every 2, 3, 4, 6, 8, etc. notes, according to the time pattern, and to inhale the same number of notes later, alternating the two in rhythmic sequence that will require no thought process after a little practice. Systematic breathing must be as subconscious as all other muscular activities connected with playing. Above all, don't let the audience know that breathing is an effort. They are not interested in your troubles. Any physical struggle detracts from their enjoyment of the performance.

Flutists and singers use more air in tone production and must breathe oftener. Clarinet players must always defer to them in the matter of breathing. If a flutist or singer breaks a phrase, break with him. It is obviously bad to hear the clarinet hold a note over while someone else

breathes. Singers often breathe in spots that are dictated by the words, to the disadvantage of the actual melody. Since the words are often more important, they must be accommodated. At rehearsal a singer will indicate breath pauses in a controversial passage. Players put apostrophes in their parts in these places to remind them to breathe, though they would not need to for physical reasons.

In a concert band, solo clarinets play the violin parts of the original orchestrations. Solid pages of notes are often encountered with no provision for breathing. Some notes must be omitted each time for a new breath. The beats of the measures, and the first notes of all slurred groups should be played, otherwise the time scheme and accents will be obscured. The two men on each stand should watch each other out of the corners of their eyes and alternately breathe. In this way one man is playing all the time and the thread of melody or figure is not lost.

Start daily practice with sustained tones of five to fifteen seconds each on one breath. Commence with first line E. If it does not sound right at first, keep at it. Some reeds require several minutes to become moistened all the way through for proper vibration. When this E sounds as it should, change to any other tone at will to relieve the monotony. Gradually reduce volume to the vanishing point. There is a certain amount of dross in every tone which is fairly constant in volume regardless of the loudness of the tone itself. It is therefore most perceptible and disagreeable in pianissimo. It is the rush of air, as distinct from vibrations—through the tube. It is like water over the dam. Change throat formations in every way you can think of to diminish this dross. In general, try to shape the throat for singing the notes you play, i. e., the throat opening larger and looser for low tones, and small and tighter for high

ones. Also, while holding jaw and lips firm for the proper pitch of each tone, experiment with throat formations as if pronouncing ah, o, ooh, etc. Whenever the quality is better, try to keep that throat formation for many long tones, to make the muscle positions a habit. As the tone improves with these experiments, gradually play louder to *ff*, keeping quality and pitch the same. Never sacrifice quality for volume. Ten or fifteen minutes of this a day will improve your tone noticeably in a short time.

Next come crescendo and diminuendo. Setting the metronome at about 120 per minute, crescendo from *pp* to *ff* in eight beats and diminuendo back to the vanishing point in eight more beats. Be careful to preserve an even rate of change. The tendency is to crescendo too rapidly. The loudest good tone may be arrived at by the fifth or sixth beat, after which there can be no further crescendo to the eighth beat. Diminuendo can be too fast or too slow in the same way. Practice also crescendo in six beats and diminuendo in six; and four and four, three and three, two and two, and finally up and down the dynamic range in one beat each way. All rates of change have their own peculiar pitfalls and require faithful practice for complete control.

At first you should stay in the medium and low registers of the clarinet to minimize lip fatigue. Venture up to high D occasionally for a few seconds, but quit when the lip feels tired or the tone is noticeably flat or "sour." It requires time to build strong lip muscles to handle the high register consistently.

Tone production must be practiced until it is done in all registers and under all conditions without thinking.

Chapter XIX

STACCATO

TONGUING is the most unnatural of all the muscular actions of clarinet playing. It is hard to acquire, easy to lose. Practice is tedious especially at first, for gearing it down to low speed like a slow-motion movie in order to observe and correct each step in the production of a note is barren of musical pleasure. After a good staccato is acquired, experienced players must practice it daily to keep in trim for their jobs.

The young student just emerging from the chrysalis stage of a high school band should devote several minutes each day to repeated notes in the easy medium register with no thought of melodies or basic figures such as scales. Notes must be even, the attack sure without any fuzzy starts, and gradually increasing in speed. The TUTUTUT must be like a machine gun. Only then is it safe to do serious scale and arpeggio practice for speed in staccato. No muscle should be driven after it is tired. The tongue will tire much more quickly than the fingers. Rest it frequently by alternating slurred groups with the staccato. These groups can be whole phrases, measures, or two or three notes. Professionals, when driven beyond their speed by solid staccato notes, which is a common occurrence in band,

can go a little faster by tonguing "two and two" if the music is in groups of four. This means slurring two and tonguing the next two notes. The rest the tongue gets by not having to attack the second note of each slurred group enables it to respond faster when attacking the other three. This style of phrasing also takes care of the natural emphasis due the first note in a group. Only the first note is held for its full time value. The other three are robbed at the end to provide time for tonguing the next note. It is a very good musical effect. In groups of six notes—sextuples—you can slur two and tongue four, or three and three, or four and two. All styles of these "tongue resters" should be mixed up in daily practice so as to be available instantly in case the printed phrasing on music is changed for any reason in actual use. There are many times in band when the solo clarinets have to slur all notes because of the speed. These same notes are all easily playable on the violin in the original orchestration because violinists have twice the staccato speed with their separate up and down bows. We have to make a round trip of the tongue for each note. The limited speed of staccato is the greatest single handicap of clarinets in a concert band.

CHAPTER XX

FINGER TECHNIC

THE fingers are the easiest to train of all the muscles used in playing. Nature intended them for a variety of uses and we employ them every minute of our walking lives. They are always ready to take up new tasks. Anybody with normal fingers can work up a great deal of accurate, fast technic on the clarinet. The main obstacle to smooth playing is due to varying natural strength and agility of the several fingers and to the differing force required to cover holes and to operate keys of all sizes. It is ironic that our two strongest fingers, the middle one on each hand, do nothing but cover one hole each, while our weakest fingers, the little ones, each have four keys to operate, of which some are double acting and have friction between their two moving parts to add to the burden of their weight. Piano students have a well planned program of calisthenics to build up weak fingers. This phase is often neglected by clarinet players to their perpetual detriment. Appropriate daily exercises are simple.

Start with low E, fingering it 1, 2, 3, 4, 5, 6, 7, 19, 22 (see chart). Raise the left little finger high and hit it hard on key 19, again and again at a rate of four or five notes a second until it begins to tire. The notes produced are E

and F. Release key 22 and repeat the motion. This adds resistance, for the little finger will have more mechanism to propel in playing E and G. Next release key 19 and hammer the right little finger in the same way on key 22 until it tires. Exercise all nine fingers in the same way to the point of minor fatigue, going the rounds several times until they really feel tired. Improved finger action will be noticeable in a few days. Sluggish fingers can be given special attention until uniform action is developed. Confine all action to the fingers. Do not use any arm movement. Some wrist movement is unavoidable in the "throat tones" G♯, A and B♭ in the staff, but it must be minimized, for large muscles cannot be operated as fast as small ones. Not only does arm movement slow down the rate of speed, but it shakes the clarinet in fast passages to the point of upsetting proper lip positions, causing squeaks.

Pay particular attention to raising the fingers. You cannot raise them as fast as you can lower them because they move from a standing start, whereas fingers in the air can benefit by a running start that is touched off a fraction of a second ahead of time. Practice jumping fingers off the holes as rapidly as possible and let them go high in the air. If you have it in mind to allow them to travel only a half inch or thereabouts, the difficulty of stopping them will surely result in their moving more slowly at the start. This cuts down the number of notes which can be played per second and it allows a longer period of glissando between notes. Theoretically the tone should not sound until the fingers are completely free of the holes so far that they do not influence quality or pitch. This distance is probably about ⅜ inch. This is impossible in legato for the tone is continuous. In slow clumsy fingering the resulting gliss is audible. With a speed of ten notes per second—not at all

fast in easy keys—the tone can be completely vented and be at its best for 75% of its allotted time if the finger can jump clear of the hole in $\frac{1}{40}$ second. If $\frac{1}{20}$ second is required, the tone can be at its best for only 50% of its time. The ear would easily notice the difference. Because of the advantage of the running start you will always be able to play descending passages in easy keys cleaner and faster than ascending passages. High action technic develops strength and flexibility of the muscles and a superior *finger consciousness* in the mind. As a train dispatcher must know at all times the location of every train in his division, so must the mind of the player know where every finger is every instant. This finger consciousness is in direct ratio to the vigor of the muscular movement. Later on, excess motion can be eliminated, but for practice during the formative period, fingers should be raised high and they should hit like hammers.

With evenly developed strength and control of individual fingers, the next step is sure and rapid combinations. The seven easiest scales and chords prescribed in Part I are only a start. They must be improved, and facility must be acquired in the other five more difficult keys. Here is an inventory of the technical armament needed to play the clarinet parts of all music.

Chromatic scale
Twelve major scales; straight, and in 3ds, 6ths and octaves
Twelve melodic minor scales; straight, and in 3ds, 6ths and octaves
Twelve harmonic minor scales; straight, and in 3ds, 6ths and octaves
Twelve major arpeggios
Twelve minor arpeggios

Twelve dominant seventh arpeggios
Twelve dominant ninth incomplete ("7-7") arpeggios
Three diminished seventh arpeggios
Two whole tone scales
Four arpeggios of augmented chords

All of the above arpeggios in all possible forms—straight line, "zig zag," by skipping one or two intervals and returning, etc.

Many Methods being sold contain these fundamentals. However, practically all of them are in duple rhythm. It is well to practice them also in 3/4 or 6/8 time to have the notes familiar in mind in patterns of three and six per beat as well. One serious omission from most methods is the dominant ninth incomplete chord, much used in "impressionist" music. It comprises the 7th, 2d, 4th and 6th scale steps. In the key of C the notes are B, D, F and A. You should write them out in all keys and get them "under your fingers."

All these are the bricks and mortar, the boards, beams, nails, etc., with which musical structures are built. They must be available for instant use in any combination demanded by the printed sheet of music. This is not possible as long as the mind is busy deciding which fingers to raise or lower. When you walk you do not *think* about raising the left foot and setting it in front of the right, and then *think* about setting the right one in front of the left. When a baby you practiced the act of walking until all motions were done subconsciously. So must you practice fingering of the clarinet until all musical figures are played without conscious thought.

No two people are constituted alike. The printed methods are like ready-made clothes. They must be altered to

fit. Practice most those note combinations which are the most difficult for you. All through the book mark parentheses around every group of 2, 3, 4, 6, 8, or more notes that cause trouble. Go back to these marked passages day after day through the years and work on them especially. Any musical passage can be compared to a stretch of road that has to be maintained by constant servicing. Fill up the biggest ruts first—practice the hardest spots. Then fill up the next largest ruts, and so on, and finally smooth the whole stretch evenly and regularly.

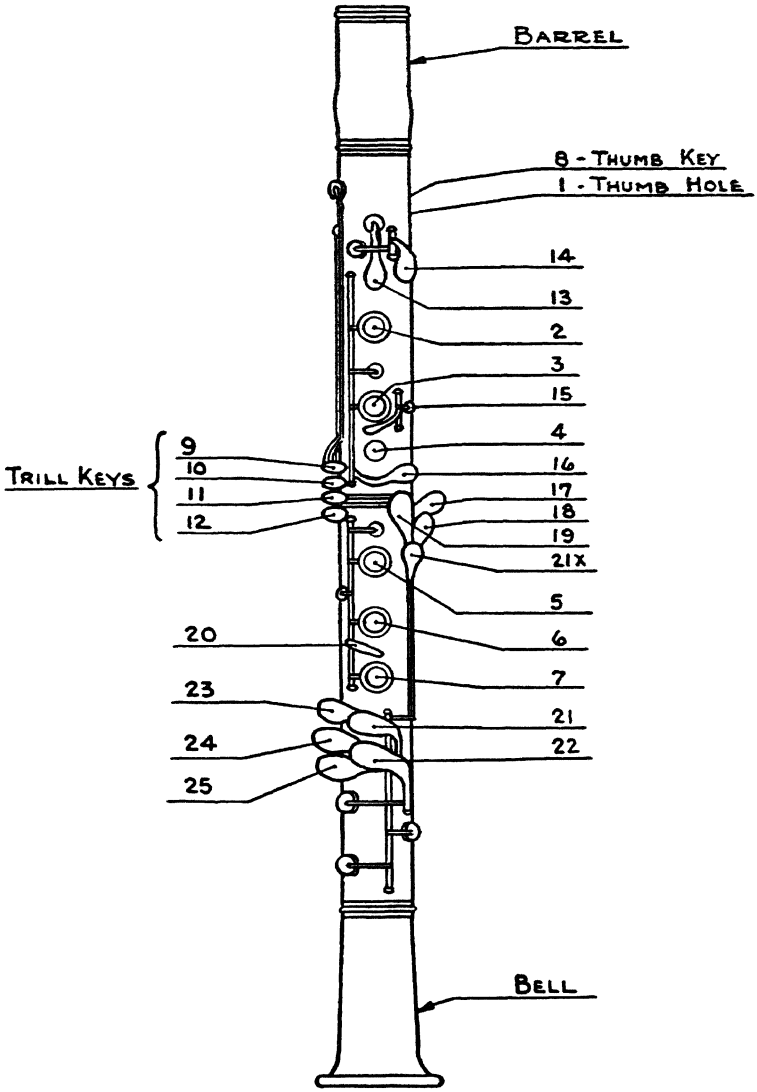
Clarinet technic is complicated by the uneven movement of fingers. Passing from one note to another may involve moving one finger or all nine. Awkward combinations are not confined to awkward keys. The clumsiest finger shift on the instrument occurs in the key of C, between notes A and B in the staff. All nine fingers must change. This shift must be practiced thousands of times before it is at all smooth, and even the best players have trouble covering it up in a really fast run. Practice this shift slowly before a mirror. Look for fingers that are late and hustle them along.

In general, but not always, transitions involving the greatest number of fingers need the most practice. When all the fingers of the same hand have to open or close together there is no trouble. Synchronizing some fingers of one hand with some of the other, all going up or down together is harder to do. The most difficult of all are changes requiring some fingers to be raised at the same instant that some other fingers are to be lowered. A perfect slur between two notes is impossible when this contrary motion of fingers is involved. The second note can sound only when fingers intended to be up are completely free of the hole, and when those which must be down are seated airtight on the holes

or have pressed the keys down completely. For a perfect slur the fingers would have to travel the required distance in no time at all. All the player can do is to cut down the transition time to the smallest possible fraction of a second, and rely on the residual impression on the ear to deceive the brain into believing that the tone is continuous. This is the same principle as the quick succession of photographs on a screen appearing to the eye as moving pictures.

Probably the worst slur on the clarinet from the musical standpoint is between B and C♯ (second space and second line above the staff). One left finger raises as two left and two right fingers descend. In addition to this acrobatic feat, the air column has to vibrate first in three sections and then in five. B is next to the top note of the second register which is built on the third partial of the fundamental scale. C♯ starts the third register built on the fifth partial. There is a "snap" in the tone when crossing registers here in both directions. It can be minimized by careful practice, but not eliminated. This is the worst shift between adjacent notes to "lip" in the entire range. The octave below this is another bad shift—B and C♯ in the staff. Both are in the same register so there is no lipping trouble, but the contrary motion of the little fingers is very bad.

FINGER CHART



CHAPTER XXI

FINGER CHART

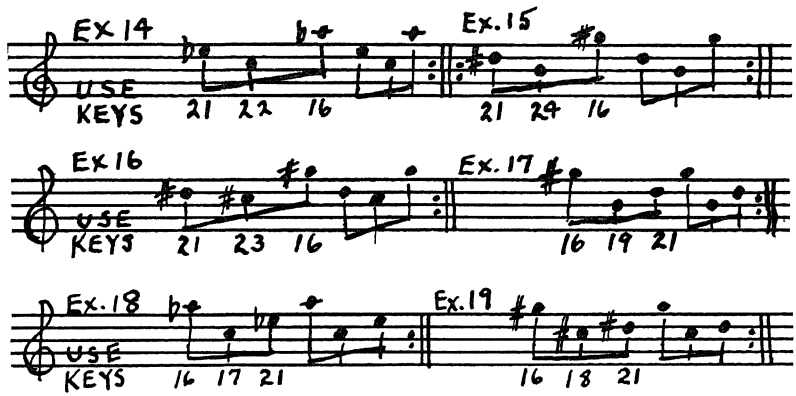
MANY notes on the clarinet can be played by two or more different fingerings. In a few cases the tone quality and pitch are identical. In most instances, however, the same note by different fingerings varies in several important characteristics. In the Chart, the most practical fingering for each note is listed first. In almost all cases it is the one which produces the best quality tone as well as the most nearly correct pitch. The few exceptions are identified as they occur in the scale. Some fingerings work best in some combinations of notes, and others are better in other combinations. By having all these alternate fingerings available for instant use, a skilled player can achieve not only cleaner and faster technic, but he can do much to better the intonation of his own clarinet, and to alter the quality of some tones to resemble their neighbors in a melody. This tonal flexibility also makes possible good chord work in the orchestra with instruments that do not have the same imperfections as the clarinet.

The Finger Chart starts with the lowest note—E♭, located in the fourth space below the staff. Each note is listed separately with its various fingerings and their characteristics. Trills are also listed with each note. If a really

good private teacher is not available, this Finger Chart will enable the alert student to plan the best fingerings for all scales and chords, as well as mixed passages of all kinds.

The extremely wide range of the clarinet makes some difficult problems. One of them is a weak spot, tonally and technically, between open G (second line) and D (fourth line). Wood-wind instruments have roughly two and one-half registers of range. The clarinet register is the interval of a twelfth in extent, as against an octave for all other wood-winds. This makes the total range of the clarinet two and a half twelfths instead of two and a half octaves for the others. It is this straight line range of a twelfth that produces the technical difficulties. There are nineteen chromatic tones in the low register before the second series of tones can be produced from the same holes, as against twelve in the flute, oboe, saxophone, etc. Nine fingers control these nineteen holes either directly or by means of keys. The gap between the main parts of these two registers, extending from open G to fourth line D is clumsy to play. The left index finger is kept busy with two keys and one hole. It needs special exercises for its training. The two little fingers bear the brunt of bridging this gap, in addition to working the key for G♯ on the space above the staff, (and C♯, its twelfth below). Each finger has a minimum of four keys, three of which are duplicates. The extra E♭ (and low A♭) lever is a fourth duplicate, and the fifth key for the left little finger. But even with this key the duplication is not complete. There is no G♯ for the right little finger. If one could be added the duplication of the work of the little fingers would be complete. Any group of notes could then be started either right- or left-handed and the two could alternate all the way through, thereby preserving an unbroken legato. As it is now all technic in that

part of the range must be carefully planned to try to avoid use of the same finger on successive notes. Alternating them allows each finger to return to the neutral position, ready for the following note. But in spite of correct planning, where several flats or sharps are involved, it is often necessary to slide a little finger from one key to another on successive notes, or if there is time, to switch from one finger to the other on the same note. The first is a physical feat. The second is chiefly mental. Careful planning can reduce the number of unavoidable slides to three for each little finger. Those for the right hand are fairly easy. With a little practice a true legato is attainable with no extra notes sounding. All of them start with the finger on key 21 and are to each of the other three keys—22, 23, and 24. Here are some exercises for perfecting these slides. Each should be repeated slowly dozens of times at each practice session before moving to the next.



The slides for the left little finger are much more difficult. They are really not slides but jumps, and in public it is often well to tongue the second note (see Ex. 17, 18 and 19) to prevent an intermediate note being sounded during the

movement of the finger. Ex. 17 is the worst of the three. It occurs in the broken chord of G♯ minor. The left little finger must jump from key 16 to 19. It is so clumsy that even the time required for tonguing hardly covers it up. This is perhaps the worst calisthenic shift on the clarinet. Other changes involving several fingers in contrary motion may seem more difficult, but the difficulty is largely mental —coordination—rather than actual acrobatics. The slide in Ex. 18 is less tricky, from key 16 to 17. It occurs in the broken arpeggio of A♭ major. In Ex. 19 the little finger slides from key 16 to 18.

There are other places where planning can avoid slides of a finger for successive notes. Worthy of mention here is the B♭, second space above the staff (and E♭, first line). Keys 12 and 15 should produce notes identical in pitch and quality and are therefore always interchangeable without thought of the musical result. But for technical reasons key 12 must be used in jumping to or from G, the minor third below. If key 15 is used, the left fourth finger has a very clumsy slide between this key and hole No. 4.

If the groups of notes in Ex. 14 to 19 occur at a fairly slow speed the hazard of a poorly executed slide can be avoided by switching fingers on the same note. In Ex. 14 instead of sliding between keys 21 and 22, play C first with the left hand, key 17, then quickly press key 22 without interrupting the tone. This frees the left little finger for use on key 16, the A♭. In the same way in Ex. 15, play B first with key 19 and then with key 24 (both in the time of the one eighth note, of course). The left little finger is thereby released for the G♯, key 16. In Ex. 16 play C♯ first with key 18 and then with 23. In Ex. 17 play B with key 24 and then 19. In Ex. 18 play C with key 22 and then 17. In Ex. 19 play C♯ first with key 23 and then No. 18. These

switches are easy to finger but they will seem strange at first.

Fingers all on one hand coordinate better than fingers on opposite hands. Where there is a choice without affecting the musical result, make use of this principle. A good example is in the chromatic scale. B♭, second space above staff, should be played with key 15. This keeps the adjacent notes all in the left hand. Right hand key 12 will not fit in so exactly. In E major and E minor arpeggios, B on the middle line should be played with key 24. The fourth and fifth fingers of the right hand work much better together than do the left fifth finger and the right fourth finger with key 19. In the same way E to C (fourth and third spaces) should be done with key 22 instead of key 17.

Correct finger planning for public performance is mandatory for the most musical results with the least effort. However, use of this system in all private practice may lead to neglect of some valuable but more difficult fingerings which should be kept ready for instant use in an emergency. It is excellent finger drill to practice each day for a few minutes the worst and most awkward finger sequences in scale and arpeggio passages. This increases actual finger nimbleness and keeps unusual fingerings in mind. Extra fingerings for each note are like synonyms in a language. Know as many as you can.

Symbols and Abbreviations Used in the Chart

Italic numbers in brackets, thus: [*1*], [*2*], [*3*], etc., identify the several fingerings for the same note.

Ordinary numbers listed in each fingering indicate keys to be pressed and holes to be covered by fingers. Thus, for low C♯ the list is—1, 2, 3, 4, 16. This means that holes

1, 2, 3, and 4 are to be covered by the corresponding fingers of the left hand, and that key 16 is to be pressed.

Keys and finger holes not listed for any one fingering of any one note are not to be touched.

The standard symbols ♯ and ♭ are used as in all music to denote raising or lowering a note one-half step. The *words* "sharp" and "flat" are used *in this chart* to describe the pitch of notes which are an unwanted and unmeasurable fraction of a step above or below what they should be.

½ TR—minor trill.

1 TR—major trill.

RL indicates by numbers following, which keys or fingers over holes are to be *Raised* and *Lowered* rapidly to make the trill. Thus for the minor trill of middle C the symbols are: ½ TR—1, 2, 3, 4. **RL** 16. It means—cover holes 1, 2, 3, and 4 with the fingers, and *Raise* and *Lower* key 16 with the left little finger. For the major trill of the same note the symbols are: 1 TR—1, 2, 3, 4. **RL** 4. This means to finger the note as usual and to *Raise* and *Lower* the fourth finger rapidly over hole No. 4.

A trill is listed as *perfect* (for want of a more accurate word) if both notes in it are produced by the best fingering, as distinguished from many trills in which fake or secondary fingerings must be used for the upper note.

Identical fingerings are those in which the same pad is raised and lowered by two different keys or levers, with no change in the musical product.

CHAPTER XXII

THE CLARINET SCALE

Low E flat (4th space below staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 25. The only fingering for this note. Key 25 is found only on Full Boehm models. If the note is sharp the bell can be pulled to suit with very little effect on any other note except B♭ the twelfth above. If it is flat the bell can be cut off at the small upper end. No harm is done if too much is taken off. It will then provide a tuning slide in both directions.

½ TR—1, 2, 3, 4, 5, 6, 7, 19, 25. **RL** 25. Perfect.

1 TR—1 2, 3, 4, 5, 6, 7, 18, 25. **RL** 25. Perfect.

* * * * *

Low E natural (4th space below the staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 19.

[*2*] 1, 2, 3, 4, 5, 6, 7, 24. The two fingerings are identical in pitch and quality. This is the bottom note on the ordinary Boehm model. Apt to be flat. If pinching the lips is not sufficient the bell can be cut off as for the full Boehm model. At least one well-known player has a special key on the bell to sharp this note. If the next note to be played after it is F, it is well to play

this E with keys 19 and 22. The right little finger is thus already in place for F and there is no chance of G being sounded because of the slowness of the finger. If the two pads are not carefully lined up, the little fingers on both of these keys will overcome any fuzziness of the tone.

½ TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 19, 22. **RL** 19.
[*2*] 1, 2, 3, 4, 5, 6, 7, 17, 24. **RL** 24.

(These two trills are identical and both are perfect.)

1 TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 19. **RL** 23.
[*2*] 1, 2, 3, 4, 5, 6, 7, 24. **RL** 18. These two trills are identical, but the upper note is slightly flat and stuffy. Can't be helped.

* * * * *

Low F (3d line below the staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 22.

[*2*] 1, 2, 3, 4, 5, 6, 7, 17. Identical fingerings. Both can be flat and stuffy if the low E pad, where the tone emerges, does not open far enough. Can be fixed by thinning the bumper cork under lever 19.

½ TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 22. **RL** 18.
[*2*] 1, 2, 3, 4, 5, 6, 7, 17. **RL** 23. The two are identical and perfect.

1 TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 22. **RL** 22.
[*2*] 1, 2, 3, 4, 5, 6, 7, 17. **RL** 17. Both are perfect and identical.

* * * * *

Low F sharp (3d line below staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 18.

[*2*] 1, 2, 3, 4, 5, 6, 7, 23. The two are identical. Often sharp. Can be flatted by lining the hole with shellac or

adhesive tape, being careful that the twelfth above, (C♯ on third space) does not become too flat. If noticeably sharp in a sustained tone, the proper pitch can be attained by slightly lowering key 19 or 24.

½ TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 18. **RL** 18.

[*2*] 1, 2, 3, 4, 5, 6, 7, 23. **RL** 23. Identical and perfect.

1 TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 18. **RL** 21. This is the only trill. The upper note is flat. Nothing can be done to help it.

* * * * *

Low G (3d space below staff)

[*1*] 1, 2, 3, 4, 5, 6, 7. The only fingering. One of the good tones. Practically no flexibility upward, but a loose lip and throat will flatten it a trifle if needed. Lowering key 19 or 24 part way will flatten this G more.

½ TR—[*1*] 1, 2, 3, 4, 5, 6, 7. **RL** 21. Perfect.

1 TR—[*1*] 1, 2, 3, 4, 5, 6, 7. **RL** 7. Perfect.

* * * * *

Low G sharp (3d space below staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 21.

[*2*] 1, 2, 3, 4, 5, 6, 7, 21X. Most clarinets do not have this key 21X. The two fingerings are identical. This note is easy to regulate for intonation and for brightness or dullness by width of key opening over hole. Pad and bumper cork can be of almost any desired thickness to accomplish this.

½ TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 21. **RL** 7, 21. Perfect. Some players can attain a higher speed by keeping little finger down on key 21 and **RL** only 7. This sharps the upper note (A nat.) slightly.

1 TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 21. **RL** 6, 7, 21. For greater speed keep key 21 open and **RL** only 6 and 7. This sharps the upper note only a very little.

* * * * *

Low A (2d line below staff)

[*1*] 1, 2, 3, 4, 5, 6. A good tone. Can be flatted as needed by keeping finger near hole 7 or by pressing key 19 or 24. Can be sharped by using key 21, either partly or fully open.

½ TR—[*1*] 1, 2, 3, 4, 5, 6. **RL** 6. Perfect.
1 TR—[*1*] 1, 2, 3, 4, 5, 6. **RL** 5. Perfect.

* * * * *

A sharp (2d line below staff) or **B flat** (2d space below)

[*1*] 1, 2, 3, 4, 5. The only fingering. An excellent tone. It and its twelfth above (F, top line) are two of the most beautiful and resonant of the entire range. Can be sharped by key 21. Can be flatted by bringing finger close to hole 6.

½ TR—[*1*] 1, 2, 3, 4, 5. **RL** 20. Perfect.
1 TR—[*1*] 1, 2, 3, 4, 5. **RL** 5. Perfect.

* * * * *

Low B natural (2d space below staff)

[*1*] 1, 2, 3, 4, 6. Bright quality, sometimes almost strident.
[*2*] 1, 2, 3, 4, 5, 20. Good quality. Useful in chromatic passages. This note, its 12th (F♯, top line) and its 17th (high E♭, third line above staff) above, which use the same fingerings, give more trouble perhaps than any other in the range. No. [*1*] fingering has to be used in most diatonic and chord passages for technical reasons,

but tuning it is a problem. Most prominent work is for the 12th (F♯ on the top line of staff). For this reason some players like to tune this F♯ correctly, making low B sharp. They then tune fingering [*2*] for low B correctly even if it makes the F♯ above it flat. This gives them one correct note in each register. If low B by [*1*] is sharp it can be lowered by adding 7 and 21. It can be lowered more by adding 7 only, and it can be lowered still more by pressing key 22 only. This makes the tone dead and stuffy but in a close chord of woodwinds it is preferable to a better quality tone that is noticeably sharp. The most desirable result is obtained by lowering the finger partly over hole 5. The pitch can be thus lowered considerably before the quality is appreciably worse. It is awkward, however and practical only at very slow speed—when it is most needed. By resting the last joint of the index finger on the rod that holds the rings in place, the pad of the finger tip can be adjusted exactly for the desired result if there is time.

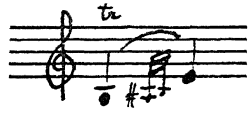
Fingering [*2*] produces a more nearly correct 12th and 17th. The tone is not so bright and incisive as by [*1*] and therefore blends better on an inner voice of a chord. The pitch can be raised a little by adding key 21. This is awkward at any speed.

½ TR—[*1*] 1, 2, 3, 4, 6. **RL** 6. Perfect.
[*2*] 1, 2, 3, 4, 5, 20. **RL** 5, 20. Perfect.

1 TR—[*1*] 1, 2, 3, 4, 6. **RL** 16.
[*2*] 1, 2, 3, 4, 5, 20. **RL** 16.
[*3*] 1, 2, 3, 4, 6. **RL** 6 and 16 in *contrary motion,* i.e., raise one finger exactly as the other is lowered and vice versa. ....
[*4*] 1, 2, 3, 4, 5, 20. **RL** 5 and 20 together in contrary motion with 16.

In [*1*] and [*2*] the upper note is flat and dull, but high speed is easy. Trills [*3*] and [*4*] are musically correct but the contrary motion is so awkward it is hard to make the motions fast enough for it to sound like a trill. The first two are usable if other instruments are playing to cover up. They are conspicuous if alone. This is where the articulated G♯ is of greatest help. It makes possible a perfect trill of this low B and of its twelfth above, F♯. With this key the fingering for this major trill is, 1, 2, 3, 4, 6, 16. **RL** 6; or 1, 2, 3, 4, 5, 16, 20. **RL** 5 and 20.

The "keyed" fingerings—[*2*] and [*4*]—for this trill must be used when the resolution includes grace notes, thus:



* * * * *

Low C (1st line below staff. Actually it is known as middle C in all other musical reference, but it is usually called low C on the clarinet because it is the lowest of the four in the range)

[*1*] 1, 2, 3, 4. A good tone. Can be raised or lowered slightly by altering the thickness of the bumper cork under the bridge key lever that governs the right hand rings on holes 5, 6 and 7. To meet a temporary emergency while playing, it can be sharped and brightened slightly by opening key 20, but in so doing the rings must not be pressed at all.

½ TR—[*1*] 1, 2, 3, 4. **RL** 16. Perfect.

1 TR—[*1*] 1, 2, 3, 4. **RL** 4. Perfect.

* * * * *

Low C sharp (1st line below staff)

[*1*] 1, 2, 3, 4, 16. One of the worst quality tones on the clarinet, due largely to the small hole through which it is produced. This hole is high, and consequently small, in order to miss the center joint. The tone is better on instruments with the Articulated G♯ because this hole is bored right through the joint. It is therefore lower down and larger. One-piece plain Boehms could have the same improved hole placement, but not all of them do have it. Pitch adjustment is easy by regulation of thickness of pad and bumper cork under key.

½ TR—[*1*] 1, 2, 3, 4, 16. **RL** 4, 16. Perfect but a little awkward. For greater speed **RL** 4 only. This slightly sharps upper note.

1 TR—[*1*] 1, 2, 3, 4, 16. **RL** 4 and 16 together in contrary motion with 12. Very difficult fast, but it is perfect and should be used whenever higher speed is not essential.

[*2*] 1, 2, 3, 4, 16. **RL** 2. Upper note not good, but useful in tutti when other instruments cover up.

[*3*] 1, 2, 3, 4, 16. **RL** 3. Possible only on clarinets with forked B♭. Upper note a trifle sharp, but usable.

[*4*] 1, 2, 3, 4, 16. **RL** 12. Upper note not the best.

* * * * *

Low D (1st space below staff)

[*1*] 1, 2, 3. One of the best tones on the clarinet. It emphasizes the poor quality of its neighbor, D♭, when they are played consecutively.

½ TR—[*1*] 1, 2, 3. **RL** 15. Perfect.

[*2*] 1, 2, 3. **RL** 12. Perfect. A good trick trill is to alternate these two keys. The speed potential is amazing. This fast double trill trick is also possible on some other notes that have two fingerings that can be alternated.

1 TR—[*1*] 1, 2, 3. **RL** 3. Perfect.

* * * * *

Low D sharp (1st space below staff)

[*1*] 1, 2, 3, 15.
[*2*] 1, 2, 3, 12.
[*3*] 1, 2, 5.
[*4*] 1, 2, 6.
[*5*] 1, 2, 4. For forked B♭ key only.

[*1*] and [*2*] should be identical in pitch and quality. Mechanically [*1*] is preferable in chromatic passages because of the better coordination of adjacent fingers. [*2*] is better in scales of four or more sharps or flats, as well as for all jumps between low D♯ and C or lower. [*3*] is slightly sharp but its twelfth above (B♭, 2d space above staff) is correct and of excellent quality. Useful in chord jumps B♭-E♭, A♯-D♯. [*4*] is quite sharp. To be used only when speed demands, in jumps such as low B nat.-D♯. [*5*] is also sharp. Can be used in rapid arpeggios encountered in band arrangements in 2d-3d clarinet parts, which are really transcribed 2d violin and viola parts. Useful in C minor chord and similar intervals.

½ TR—[*1*] 1, 2, 3, 15. **RL** 3, 15. Perfect.

[*2*] 1, 2, 3, 12. **RL** 3, 12. Perfect, but difficult coordination of fingers on both hands.

[*3*] 1, 2, 3, 12. **RL** 3. Fastest of the three trills, but the upper note is a trifle sharp.

1 TR—[*1*] 1, 2, 3, 15. **RL** 2, 3, 15. Perfect and not really difficult for these three fingers synchronize naturally.

[*2*] 1, 2, 3, 12. **RL** 2, 3. Slightly sharps upper note, but it is fine for high speed.

* * * * *

E (1st line of staff)

[*1*] 1, 2. Good quality and intonation usually correct. The twelfth above (B, 2d space above staff) is often sharp. Some players bring it down to pitch, making first line E too low for sustained tones. It can be raised a little by opening key 16. Key 12 or 15 will raise it much more.

½ TR—[*1*] 1, 2. **RL** 2. Perfect, easy, fast.

1 TR—[*1*] 1, 2. **RL** 1. Perfect. It usually requires more practice to develop speed in the thumb than in fingers, but it can be developed.

* * * * *

F (1st space of staff)

[*1*] 1. A good tone. Should require no tinkering.

½ TR—[*1*] 1. **RL** 11, 12. Perfect and easy.

1 TR—[*1*] 1. **RL** 1. Perfect and fairly easy, except that there is nothing to grip the clarinet and careful balance on the right thumb is needed to prevent rolling out of blowing position. Key 21 or 22 can be pressed firmly to help grip the instrument, with no appreciable effect on intonation.

* * * * *

F sharp (1st space of staff)

[*1*] 2.

[*2*] 1, 11, 12. Both are good tones and they should be correctly tuned because no other legitimate tone is emitted from these holes. The twelfths above are fingered differently. Use [*1*] in going to or from E, and [*2*] in passing to or from F nat.

½ TR—[*1*] 2. **RL** 2. Perfect, easy.

1 TR—[*1*] 2. **RL** 2 and 14 in contrary motion. Perfect but difficult.

[*2*] 2. **RL** 14 while keeping 2 closed. Demands a rotating wrist motion for key 14 to be opened by the second joint of the same finger that is keeping hole 2 closed. The upper note is slightly stuffy but it is a good trill if done fast.

[*3*] 2. **RL** 10. Upper note bad, but usable in tutti especially if higher notes are sounding at the same time to cover up.

* * * * *

G (2d line of staff)

There is only one way of producing this note—by not touching any key or hole. For this reason it is called "open G." Pitch can be regulated by thickness of bumper cork under thumb ring arm, which governs width of opening of tiny pad attached to ring arm of hole 2.

½ TR—[*1*] **RL** 14. Perfect.

1 TR—[*1*] **RL** 13. Perfect.

* * * * *

G sharp (2d line of staff)

[*1*] 14. Pitch determined by bumper cork.

½ TR—[*1*] 14. **RL** 13 with end joint of same finger that holds open key 14 by the middle joint. Hard

to do fast and evenly. This trill is potentially perfect, though if key 14 is only slightly open when A is played normally, the top note will be a trifle sharp because key 14 is held wide open during the trill. Regulation of keys 13 and 14 by cork or set screw differs with each instrument.

[2] 14. **RL** 10. Upper note bad, but greater speed attainable. This upper note is too flat for a good major trill and too sharp for a good minor trill.

1 TR—[1] 14. **RL** 8, 13.

[2] 14. **RL** 10, 13. These two trills are perfect but difficult.

[3] 14. **RL** 10. Upper note flat. Usable in tutti.

* * * * *

A (2d space of staff)

[1] 13. Pitch regulated by thickness of its own pad, or of cork used for silencer where it hits G♯ key overhead. The set screw of this key is often worthless. A cork can be shaved to proper thickness by a razor blade. It must be kept greased. Dry cork on a friction contact is apt to tear and crumble.

½ TR—[1] 13. **RL** 10. Perfect.

[2] 13. **RL** 8. Correct, but tone of B♭ through keyhole 8 is not as good quality as through 10.

1 TR—[1] 13. **RL** 9. Be sure that key 10 is not also opened.

* * * * *

B flat (middle line of staff)

[1] 13, 8.

[2] 13, 10.

[*3*] 1, 2, 3, 4, 5, 6, 7, 25. Only for clarinets with the low E♭ key. [*1*] is the proper pitch but of poor quality because the hole is a compromise in size. It emits the note B♭ and also creates the node in the air column to produce all tones above this B♭. This is the worst of the "throat tones" at the top of the tube. Their inferior quality is caused by the extremely short column of air in use, preventing many upper harmonics essential to a good "rich" tone. (See any standard text on the physics of sound.) This B♭ is flexible in pitch and easy to change slightly by amount of key opening. It can also be sharped a little by opening keys 11 and 12, and 14 can also be opened fully if 13 does not push it wide open. [*2*] is better quality than [*1*] because it comes from a larger hole, for better venting, and because this hole is farther down the tube, allowing more high harmonics for richness. This fingering should be used whenever the right index finger is free both before and after B♭. It is impossible to jump this finger from key 10 to hole 5 or vice versa without sounding an intervening note. Even in staccato it can be done only at slow speed. Since this hole is not used for any other note, tuning is easy. Fingering [*3*] gives a totally different tone of controversial quality. It is very useful in a melody in the second register that would otherwise have to dip to the poor quality throat B♭ by [*1*], providing technical smoothness and tonal uniformity.

½ TR—[*1*] 8, 13. **RL** 10. Slightly flat but quite good quality.

[*2*] 8, 13. **RL** 9. Upper note sharp. Not as good as [*1*].

1 TR—[*1*] 8, 13. **RL** 9, 10. Very good.

* * * * *

B nat. (middle line of staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 8, 19.

[*2*] 1, 2, 3, 4, 5, 6, 7, 8, 24. Identical fingerings. This note starts the second register of the clarinet. Again every hole is closed on the tube as for the production of low E, except that the thumb must keep open key 8 to prevent low E sounding. The node in the air column made by the small hole under key 8 compels it to vibrate in three segments at the same time. The vibrations are thereby three times as rapid and the tone produced is B nat., the interval of a twelfth above the fundamental low E. This second register that starts with B extends for fourteen notes through C (2d line above staff) and the fingering is identical with that of the first fourteen notes from low E upward, except for the open key No. 8.

All trills are the same as for low E.

* * * * *

C (3d space of staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 8, 22.

[*2*] 1, 2, 3, 4, 5, 6, 7, 8, 17. Identical. (See data on low F).

All trills are the same as for low F.

* * * * *

C sharp (3d space of staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 8, 18.

[*2*] 1, 2, 3, 4, 5, 6, 7, 8, 23. See low F♯.

All trills are the same as for low F♯.

* * * * *

D (4th line of staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 8. The quality is slightly dull and stuffy on most clarinets, and it is often flat. It can be helped by a thinner pad on key 18, which will let key 22 open wider, where tone D emerges. The bumper cork under lever 19 may have to be thinned to correspond. A more drastic remedy is to ream out the hole under key 22. The tone hole rim where pad seats should not be touched; the sides of the hole should be slanted inward toward the bore like a volcano cone. Reaming any hole is more effective on the "north" side (nearest mouthpiece) because it shortens the vibrating column of air. Reaming of the "south" side vents the tone better, but does not shorten the column. If these alterations brighten and sharp low G disagreeably, it can be flatted at slow speed by a loose lip and throat or by partial closing of key 19 or 24. The low G is more flexible and is less prominent in the range than the D. Necessary error can well be shifted to it.

All trills are the same as for low G.

* * * * *

D sharp (4th line of staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 8, 21.

[*2*] 1, 2, 3, 4, 5, 6, 7, 8, 21X. See low G♯.

All trills are the same as for low G♯.

* * * * *

E (4th space of staff)

[*1*] 1, 2, 3, 4, 5, 6, 8. A good tone. Can be slightly sharped by addition of 21, wholly or partway opened; and flat-

ted by addition of 23, 22 or 24, or by bringing finger near hole 7.

All trills are the same as for low A.

* * * * *

F (top line of staff)

[*1*] 1, 2, 3, 4, 5, 8. One of the best tones on the clarinet. It can be lowered by key 22, 23, or 24 and raised by 21.

All trills are the same as for low B♭.

* * * * *

F sharp (top line of staff)

[*1*] 1, 2, 3, 4, 6, 8.

[*2*] 1, 2, 3, 4, 5, 8, 20. Both good. (See low B nat.) If [*2*] is lowered to make a correct low B, this F♯ may be too flat for slow passages. [*1*] is better for diatonic groups; [*2*] for chromatic.

[*3*] 1, 2, 3, 4, 7, 8. Fine quality. Better vented, hence clearer than [*1*]. It is quite sharp. Occasionally useful in a passage with fortissimo flute, which is usually sharp.

All trills are the same as for low B nat.

* * * * *

G (1st space above staff)

[*1*] 1, 2, 3, 4, 8. Good quality. See low C, twelfth below.

All trills are the same as for low C.

* * * * *

G sharp (1st space above staff) and **A flat** (1st line above)

[*1*] 1, 2, 3, 4, 8, 16.

[*2*] 1, 2, 3, 5, 6, 8. [*1*] is not really good quality because

of the small hole through which it emerges. See explanation for low C♯. [*2*] is a dull, weak tone, but correct in pitch. It is useful in an emergency if key 16 has water in it to cause a gurgle when there is no time to swab it out. It is also very useful in playing the notes in Ex. 14 on page 131. This avoids sliding from key 21 to 22. The rule is—if the speed is too great for a clean slide for nimble fingers, it is too great for the ear to detect the poor quality of the G♯ by [*2*]. Its use is justified by preserving the rhythmic pattern. Also being weak, it neutralizes the natural incisiveness of its high position in the phrase. The "weight" of the three notes in this phrase is almost identical without any effort on the player's part to balance them.

All trills are the same as for low C♯.

* * * * *

A (1st line above staff)

[*1*] 1, 2, 3, 8. A good tone. Can be lowered by partly closing right hand rings for a long tone, and raised by key 16.

All trills are the same as for low D.

* * * * *

B flat (2d space above staff)

[*1*] 1, 2, 3, 8, 15.
[*2*] 1, 2, 3, 8, 12.
[*3*] 1, 2, 5, 8.
[*4*] 1, 2, 6, 8.
[*5*] 1, 2, 7, 8.
[*6*] 1, 2, 4, 8. Requires the forked B♭ key.

[*1*], [*2*], and [*3*] are all correct in pitch and of good quality. [*3*] often has the best resonance of any and many players use it for all sustained tones. [*4*] and [*5*] are sharp but permissible in fast work. [*5*] is useful chiefly in a slur down from high E♭ when its fingering [*2*] is used. [*6*] is a good tone, very useful in chords of E♭ major and G minor, and in all other phrases where G and B♭ occur consecutively in either direction.

All trills are the same as for low D♯. In addition, the best minor trill for this B♭ is as follows:

½ TR—[*4*] 1, 2, 5. **RL** 5.

* * * * *

B natural (2d space above staff)

[*1*] 1, 2, 8. A good tone. If sharp, loose lip and throat will lower.

½ TR—[*1*] 1, 2, 8. **RL** 2. Perfect.

1 TR—[*1*] 1, 2, 8. **RL** 11, 12. Fast and easy, though top note is a little flat, and nasal in quality.

[*2*] 1, 2, 8. **RL** 14. A much more musical trill than [*1*]. Key 14 must be opened and closed by middle joint of the same finger that keeps hole 2 covered. Requires a rotary motion of wrist that must not shake the clarinet.

* * * * *

C (2d line above staff)

[*1*] 1, 8. Top note of legitimate second register of the instrument. It is quite flexible by "lipping," especially downward. If it is flat (rare) open key 12 to raise it.

½ TR—[*1*] 1, 8. **RL** 11, 12. Easy and good.

1 TR—[*1*] 1, 8. **RL** 10. Usually a trifle sharp but of good quality.

[2] 1, 8. **RL** 14. The upper note is apt to be flat and not good quality. These two fingerings differ greatly with individual instruments. The better one should be decided upon and used exclusively.

* * * * *

High C sharp (2d line above staff)

This note begins the third register of the clarinet scale. From here up for nine notes through high A, hole No. 2 is left open to create a second node in the air column, to divide it into five segments. The vibrations are five times as fast as in the corresponding fundamental notes in the first register. The first six of these nine notes are fingered the same as their counterparts in the two lower registers, except for hole No. 2 being open. This hole thus has to perform two tasks—emit F (1st space of staff) and C (2d line above staff); and act as a register key for the top section of the range. For this latter purpose it should be much smaller, similar to the tiny hole under the octave key of the oboe. Its present size makes the top notes more difficult to achieve than should be the case. In a slow skip from below to this top register, a much easier and more musical slur can be made if the left index finger is *rolled* south (away from the mouthpiece) from the hole instead of being suddenly raised. A slow roll produces momentarily a very small opening which helps break the air column into the required five segments. Once the tone starts to sound, the continued roll of the finger until it is entirely off the hole does not detract in any way. In other words, the high tone will *start* most easily with the smallest obtainable opening at hole No. 2.

In this extreme high register lip pressure must be in-

creased greatly to shorten the free tip of the reed. This pressure interferes with proper blood supply. The lip must have frequent and ample rest for re-establishment of normal circulation through the lip muscles.

[*1*] 1, 3, 4, 5, 6, 8. Inclined to be harsh and incisive, and plenty sharp. Flexible downward by relaxing lip, or by keeping hole No. 2 partly covered, or both.

[*2*] 1, 8, 11, 12. This tone is actually a continuation of the second register, built on the third partial. It can be slurred to easily from any note in the second register, but the quality is thin and nasal. Should be used only for trills and for occasional rapid passages from below that turn back without actually going up into the third register.

½ TR—[*1*] 1, 3, 4, 5, 6, 8. **RL** 6. Easy and very good, though the upper note, D, is a trifle flat, especially in relation to the C♯ which is never flat.

[*2*] 1, 3, 4, 5, 6, 8. **RL** 14. Very good. Upper note slightly sharp, but weaker in volume and quality. This prevents undue prominence.

1 TR—[*1*] 1, 3, 4, 5, 6, 8. **RL** 5. Easy and fast. A very good trill even though the upper note alone is a trifle flat on all clarinets.

* * * * *

High D (3d space above staff)

[*1*] 1, 3, 4, 5, 8, 21. From this note up to A, key 21 should be kept open to prevent flatness. Essential for this D and D♯, the effect diminishes with each succeeding note above. Clarinets differ so much in this high part of the range that no rules can be set. Experiment with your own clarinet for best secondary fingerings for trills

and other fast work. Practice for speed with the one best fingering for each of these high notes.

[*2*] 1, 8, 10.

[*3*] 1, 8, 14. These two are hardly good enough quality for sustained tones. All right for trills and certain fast phrases where [*1*] is impractical.

½ TR—[*1*] 1, 3, 4, 5, 8, 21. **RL** 20. Perfect, easy.

1 TR—[*1*] 1, 3, 4, 5, 8, 21. **RL** 5. Perfect, easy.

* * * * *

High D sharp (3d space above staff)

[*1*] 1, 3, 4, 5, 8, 20, 21. Good quality and pitch.

[*2*] 1, 3, 4, 7, 8, 21. Excellent. Useful chiefly for the slur up from the octave below.

[*3*] 1, 3, 4, 6, 8, 21. Good quality but flat. All right for speed work.

½ TR—[*1*] 1, 3, 4, 5, 8, 20, 21. **RL** 5, 20. Perfect and quite easy.

1 TR—[*1*] 1, 3, 4, 5, 8, 20, 21. RL 4. Easy and very good.

[*2*] 1, 3, 4, 6, 8, 21. **RL** 4. A good trill of a bad note. This D♯ or E♭ is flat. Fingering [*1*] should be used.

* * * * *

High E (3d line above staff)

[*1*] 1, 3, 4, 8, 21. Good quality and should be in tune. All of these extreme high notes are very flexible downward with relaxed lip. This E can be sharped by key 20, but the right hand rings must not be touched.

[*2*] 1, 3, 4, 8, 22. Slurs better, and the quality is sometimes better than [*1*].

½ TR—[*1*] 1, 3, 4, 8, 21. **RL** 16. Perfect. Easy.
1 TR—[*1*] 1, 3, 4, 8, 21. **RL** 4. Very good. Easy.

* * * * *

High F (4th space above staff)

[*1*] 1, 3, 4, 8, 16, 21. Very good, but inclined to be shrill with a mediocre reed. Hard to slur up to from below, especially from C (2d line above staff) and from F (top line of staff).

[*2*] 1, 2, 3, 4, 5, 6, 7, 8, 16. Possible only on clarinets which do not have the articulated G♯. Known as the "closed" F because all finger holes are closed. It is a different harmonic from its neighbors, which accounts for the ease with which it can be slurred up to from C or below. Ideal for slurring the octave from below. Many players prefer this closed F to the articulated G♯. Both cannot be had on the same clarinet.

½ TR—[*1*] 1, 3, 4, 8, 16, 21. **RL** 4, 16. Very good. Quite easy. For still more speed—**RL** 4 only. This makes upper note a little sharp.

1 TR—[*1*] 1, 3, 4, 8, 16, 21. **RL** 3. Very good. Easy.

* * * * *

High F sharp (4th space above staff)

[*1*] 1, 3, 8, 21.

[*2*] 1, 2, 3, 8, 12, 21.

[*3*] 1, 2, 3, 5, 6, 7, 8, 21.

[*1*] may be a trifle flat and thin and strident in quality, but it is indispensible in chromatic and certain scale passages. [*2*] is the best quality of all and plenty sharp to allow a weak reed or a tired lip to make the pitch. It can be lowered easily, and the quality will be

improved, by relaxing lip. This is the best F♯ for the second cadenza of Liszt's Second Rhapsody. [*3*] is fine for a slur from the octave below. Clumsy to finger in most other combinations. It is correct in pitch and not so shrill as [*1*].

½ TR—[*1*] 1, 2, 3, 8, 12, 21. **RL** 3. Good. Easy.
[*2*] 1, 3, 8, 21. **RL** 15 or 12. Easy but upper note slightly flat.

1 TR—[*1*] 1, 2, 3, 8, 12, 21. **RL** 2, 3. Very good.
[*2*] 1, 3, 8, 21. **RL** 11, 12. Good on some clarinets. Upper note flat on most instruments.

* * * * *

High G (4th line above staff)

[*1*] 1, 3, 5, 6, 8, 21. Best for general use.

[*2*] 1, 2, 4, 5, 6, 8, 21. Good. Flatter than [*1*] and not so strident.

[*3*] 1, 3, 4, 5, 6, 8, 21. Excellent.

[*4*] 1, 2, 8, 21. Good, but may need key 12 or 15 open to sharp it. Most useful in skips to and from E and D just below.

[*5*] 1, 3, 8, 12, 21.

[*6*] 1, 3, 8, 15, 21.

Many other finger combinations will also produce this note. Some are good and some bad, differing with clarinets. Any means are justified if you achieve the end — correct pitch, good quality, fingering simple enough to be practical, and capable of being slurred easily up from below. Slurs are specified, for almost any note can be started more easily if it is attacked. It is well to note that Mozart and Beethoven never wrote above this high G for clarinet. It has always been considered the top of the practical, *musical* range.

½ TR—[*1*] 1, 3, 4, 5, 6, 8, 21. **RL** 5.
[*2*] 1, 3, 5, 6, 8, 21. **RL** 5.
[*3*] 1, 2, 8, 21. **RL** 11, 12.
1 TR—[*1*] 1, 3, 4, 5, 6, 8, 21. **RL** 5, 6. Very good.
[*2*] 1, 2, 8, 21. **RL** 1, 2, 8. Upper note weak. It is the overblown open G (2d line). Requires a good reed and lip. Fingering [*1*] preferable.

* * * * *

High G sharp (4th line above staff)

[*1*] 1, 3, 4, 5, 8, 20, 21. Best of many.
[*2*] 1, 3, 6, 8, 21. Quality and pitch good but unstable, and likely to "break" into some false harmonic.
[*3*] 1, 4, 6, 8, 21. Good.
[*4*] 1, 3, 4, 5, 6, 7, 8. Sharp. Good for use with a weak reed or tired lip.
[*5*] 1, 3, 4, 5, 7, 8. Good quality but sharp.
[*6*] 1, 8, 10, 21. Unstable, flat.

Fingerings which make these high notes a little sharp are welcome "lip savers." Relaxing to flat them often removes some of the harshness also.

½ TR—[*1*] 1, 3, 4, 5, 8, 20, 21. **RL** 5, 20. Easy and quite good. Top note flat.
[*2*] 1, 3, 4, 6, 8, 21. **RL** 6.
[*3*] 1, 3, 4, 5, 6, 7, 8. **RL** 21.
1 TR—[*1*] 1, 3, 4, 5, 6, 7, 8. **RL** 2, 14, 17, 21. Difficult but possible.

* * * * *

High A (5th space above staff)

[*1*] 1, 3, 4, 8, 21. If a little flat, add key 20, leaving the rings untouched.

½ TR—[*1*] 1, 3, 4, 8, 21. **RL** 14, 16. Good but difficult.
1 TR—[*1*] 1, 3, 4, 8, 21. Raise 4, and lower in contrary motion 2, 5, 6. Can sound well with a good reed, a tough lip and accurate fingers. Even so, it is only a stunt.

* * * * *

High B flat (5th line above staff)

[*1*] 1, 2, 3, 4, 5, 6, 7, 8, 14, 17, 21. A good tone, better than either of its nearest neighbors, A and B nat. Easy to slur up to it from the octave below when its fingering [*3*] is used.

½ TR—[*1*] .1, 2, 3, 4, 5, 6, 7, 8, 14, 17, 21. **RL** 4, 7.
1 TR—[*1*] 1, 2, 3, 4, 5, 6, 7, 8, 14, 17, 21. **RL** 3, 4, 6, 7. With a stiff reed and a strong lip this can be a fairly musical trill.

* * * * *

High B nat. (5th line above staff)

[*1*] 1, 2, 3, 5, 6, 8, 21. Requires a fine reed and lots of pressure. Shrill and penetrating. Seldom encountered, luckily.

½ TR—[*1*] 1, 2, 3, 5, 6, 8, 21. **RL** 3, 6. Fingering easy. A lip killer. There is no major trill, for the next half step above, C, is the top of the range.

* * * * *

High C (6th space above staff)

[*1*] 1, 2, 5, 8, 21. This is the top note of the legitimate register, though a few players have been known to tame harmonics up to E♭, the minor third above. This extra third is only a freak stunt. It is bad enough to try to play high C musically.

Chapter XXIII

MODULATION EXERCISES

ON violin and piano, especially the former, one key is about as easy as any other. This is not the case with reed instruments, and the clarinet just about heads the list of victims of "remote" keys. C, F and G are easy because through most of the range the change of one note in distance requires the change of one finger only. As sharps and flats are added, the number of complex changes increases. Contrary motion of fingers is the worst of them. It is axiomatic that the easiest keys are only a half step away from the hardest ones. A progression of a half-step up or down means the addition of five or seven flats or sharps, depending on the direction of change and the key prevailing at the time. After a working knowledge of fundamental technic in all keys is acquired, one of the finest finger conditioners and trainers is the modulation exercise. Any simple figure becomes difficult in some keys. By forming the habit of drilling the fingers on these hard spots, technic is improved noticeably.

Modulation exercises can be invented by each player in endless quantity and variety. If the idea is new, short simple ones should be used at first. Longer and more intricate patterns can be added at will. The system is very

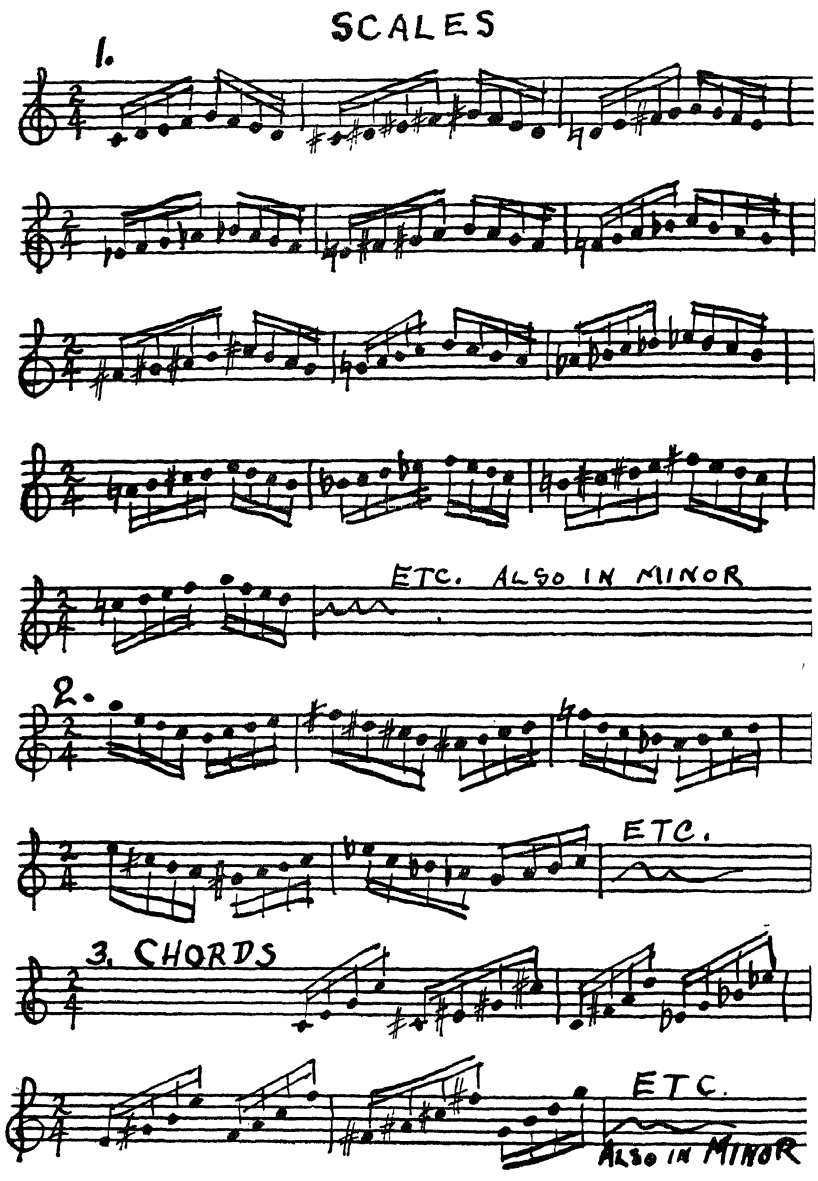
simple but it is surprising how few good players can improvise their own material. The constant change through improvisation not only relieves some of the monotony of daily practice but it creates the habit of thinking of melodies and figures in the relative position of their notes rather than in some exact visual position on the staff. This trait is of tremendous help in transposition when all notes in a line are moved up or down a desired distance.

Here are a few modulation exercises that are beneficial in themselves, but which are more useful in pointing the way to make your own. Only the first one is written out for a full octave. This establishes the system. Each player can write out in full to both extremes of the range the other exercises if he has trouble playing them by calculation without benefit of sight. Scales, chords and melodies can be used to make these etudes. Chromatic figures are the hardest to keep track of because they erase momentarily the memory of the diatonic scale with its two half-steps which act as guides. As the knack for playing everything in all twelve keys develops, it is very easy to write trickier figures to keep busy both mind and fingers. If you want a real workout use the Scarf Dance cadenza, starting it a half-step lower each time.

Remember that a lot of speed in simple keys only is of little use in the music business. The aim should be well balanced facility in all keys. Hence, in the daily practice of these modulation studies, if a group of notes is 100 times as hard to play in one key as it is in another, practice that group 200 times as much as the easy one. Go slowly so that all notes sound. Don't skim or miss any. Increase speed warily, and slow down at the moment of stumbling.

As these exercises increase in complexity and difficulty it will be found by most players that descending groups are

easier to think and to execute than ascending passages. If this is the case with you, do more of the latter. The basic motto of all practice should be—*practice the hardest things the most.*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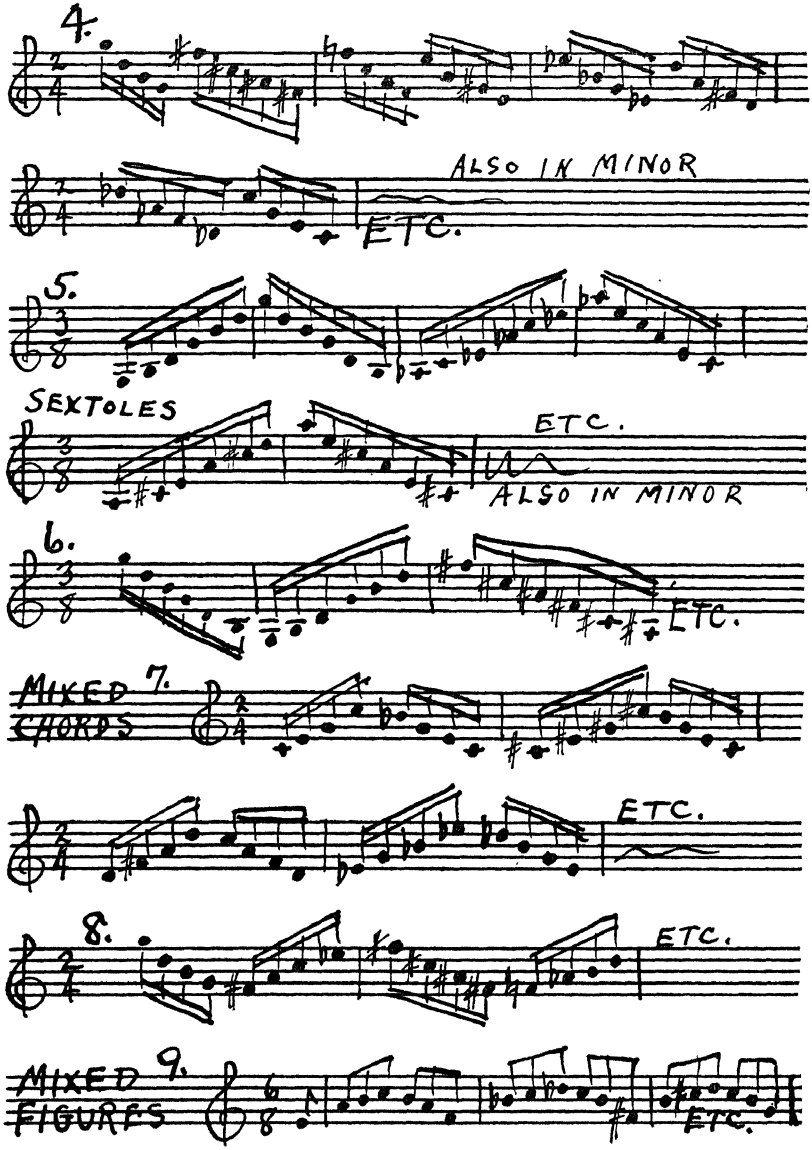
ETC. ALSO IN MINOR
2.
ETC.
3. CHORDS
ETC.
ALSO IN MINOR


4.
ALSO IN MINOR
ETC.
5.
SEXTOLES
ETC.
ALSO IN MINOR
6.
ETC.
MIXED CHORDS
7.
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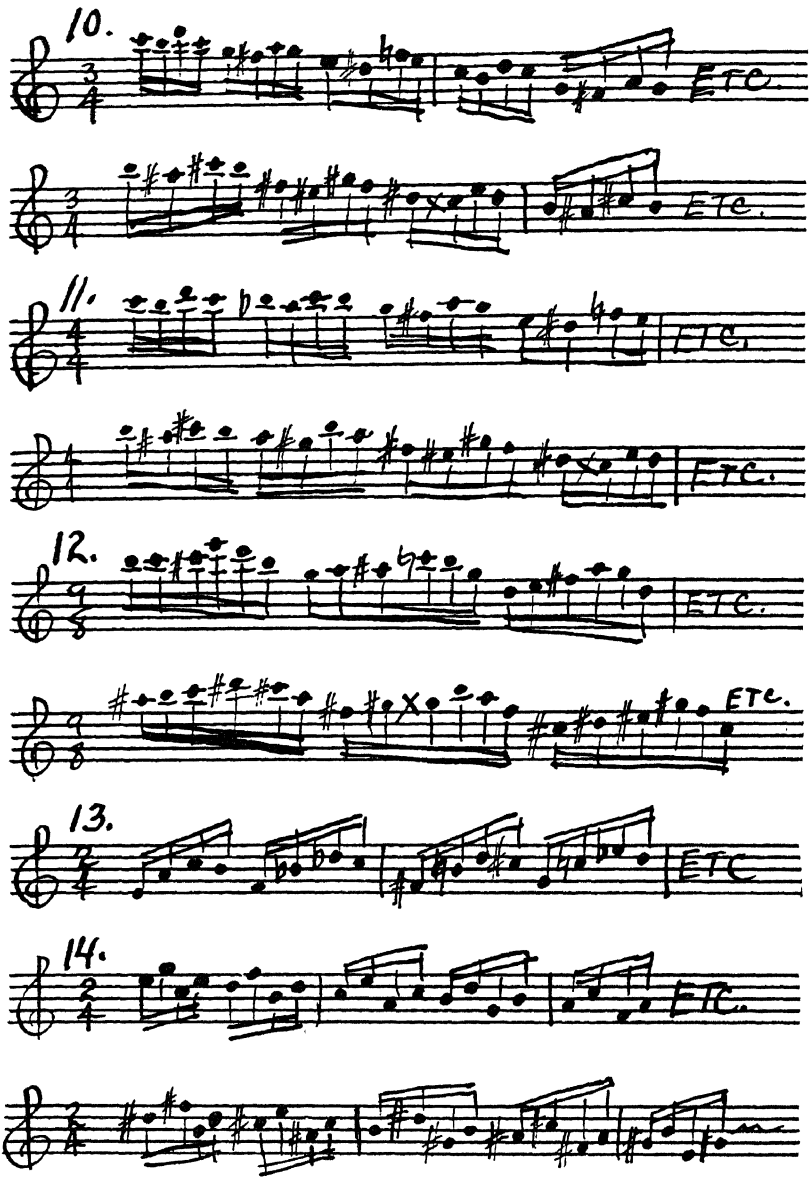
8.
ETC.
MIXED FIGURES
9.
ETC.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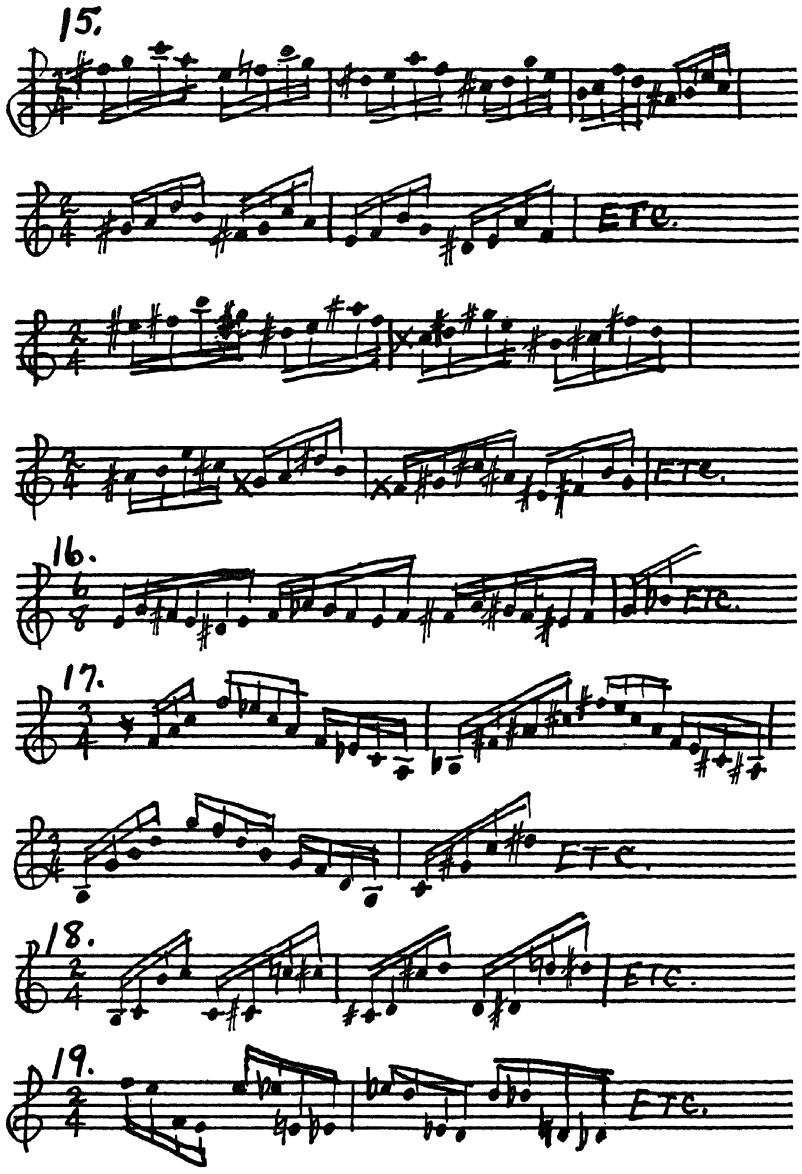
15.
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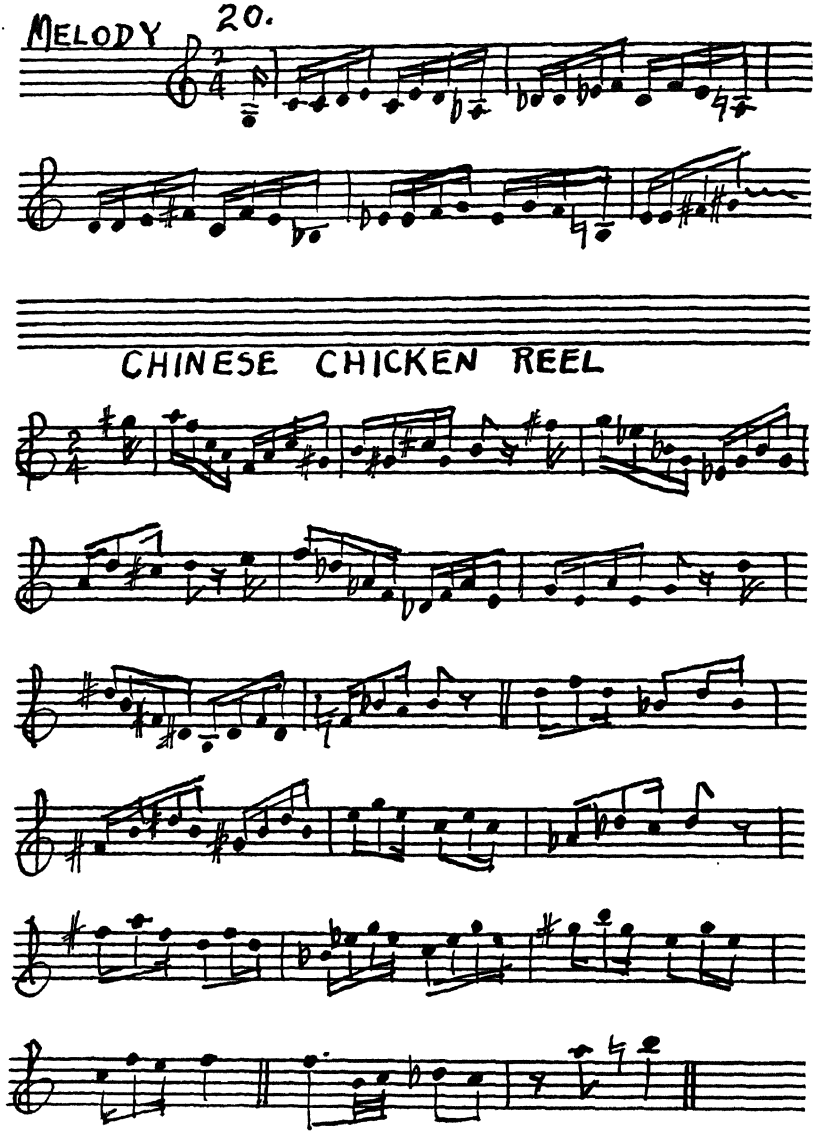


PART III

MAKING *MUSIC*

After acquiring complete technical command

INTRODUCTION

UP to now we have dealt largely with the calisthenics used to control the clarinet. This control embraces: (1) A pleasing quality of tone in all registers, which can be sustained smoothly at any level from pianissimo to fortissimo, or which can perform an even crescendo or diminuendo from one extreme to the other at any desired speed of change, ranging from a fraction of a second up to twenty or thirty seconds; (2) An accurate and musical staccato of six or seven notes per second in an extended passage, and of eight or nine notes in short bursts; (3) A command of all scales and arpeggios in all keys with mathematical precision and absence of mistakes.

With all this technical mastery, much remains to be done to produce a finished player, ready for any kind of public performance. The approach to these remaining problems is different, relying on judgment and inherent sense of music, instead of on calisthenics. Very important is teamwork with other clarinets, with flutes and oboes, and to a lesser degree with others of the family of instruments. In a good symphony wood-wind section each man knows the bad notes and the playing weaknesses of his colleagues and tries at all times to meet them halfway. It is not a question of being right, but of being together. The man who maintains an "I'm right" attitude and refuses to favor a note up or down to meet a fault in some other instrument is just courting trouble. The time will surely come to him when he will want someone else to modify a note to meet his own imperfect instrument or a new reed that is not correct in intonation in all registers. He will need the good will, not the antagonism of his fellow players. Teamwork is as essen-

tial for good ensemble playing as for any other line of human endeavor. Good teamwork depends upon good will among team members. Players must learn, and make allowances for, the difficulties that other instrumentalists have to struggle with, in order that the others will make allowances for their faults. Most of this has to be acquired the hard way, by actually playing in professional groups. The start is difficult in these days of paid rehearsals, when producers and leaders understandably expect something for their money. This transition from private practice to public performance is made easier by an understanding of the problems involved. The following pages present and discuss many of these problems.

CHAPTER XXIV

TONE QUALITY—INTONATION—EVENNESS OF SCALE

AT slow speed, pure, beautiful tone and exact intonation are the two main components of good music. In choosing a fingering for a note which has several, these two factors must always have first consideration. Only technical difficulty because of speed is a valid excuse for not using the best *musical* fingering for each note. At a speed somewhere near five or six per second, notes are of such short duration that the ear's ability to judge quality and pitch is materially impaired. Instead, its attention is attracted to rhythm patterns and to melody contours. At these higher speeds the player may well turn if necessary to secondary fingerings if they contribute toward technical perfection. The ultimate goal, good music, justifies any steps taken toward that end.

The human ear has a finer perception of tone quality than of pitch. An artist playing alone can devote his principal attention to producing the best tone of which he is capable at the expense of exact intonation. In group playing or singing the opposite is the case. While the ear cannot detect slight discrepancies in pitch in a single

melody line, it is quick to hear and dislike the *beats** caused by two instruments slightly at variance, or the actual disparity if the difference is greater. Many good choral singers have surprisingly poor voices when heard alone. They are more valuable in the group, for their musicianship and their ability to sing in tune, than others with better voices who do not tune so well.

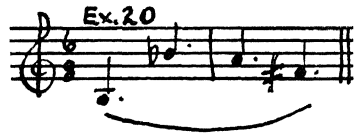
In the orchestra good intonation is the pot of gold at the end of the rainbow—the most difficult of all the phases of good playing. It is the subject of perpetual controversy in the dressing room. The reasons are many, and easy to understand.

Our music is based on the tempered scale which has inherent faults. It can be compared to a flat map of this spherical world we live on. The farther we get away from the center *(temperament)* of the scale, up or down, the greater is the error in pitch. The clarinet, with its practical range of more than three octaves and its absolute range of nearly four, is a principal victim of this progressive error. The orchestra is composed of families of instruments employing different vibrating mediums for tone production which respond differently to physical laws at any one time, and which vary each in itself from day to day because of weather and other factors.

The clarinet has a number of off notes which have so far defied the efforts of the makers to tune them exactly with the easy fingerings. At high speed nothing much can be done about them. Fortunately little needs to be done due to the ear's imperfections. But at slow speed, and especially in chord work with other wood-winds these bad notes are noticeable unless helped up or down as needed

* Consult any standard text on theory or piano tuning for explanation of *beats,* and the *tempered scale.*

by "fake" or auxilliary fingerings. Even though some of these altered notes are perceptibly impaired in tone quality, the gain in intonation is desirable. When to do this is a matter of experience, judgment and artistry in the performer. There are no set rules. Occasionally it is possible to gain all desired ends and lose nothing in the process. A fine example of this occurred in a Broadway musical show a few years ago. An important solo passage contained four notes, of which the first two are bad as usually played, the first note being sharp and the second one fuzzy and dull in quality. Here is the passage:



It was imperative that all the notes be as correct and beautiful as possible, for the singer took his pitch from them for his next entrance. In the case of the first note—B♮—addition of key 22, or closing hole 7 and pressing key 21, flats the pitch to about what is wanted, but either remedy fogs quality and decreases volume. If the fingering [*2*] were used (see chart) the right index finger would then be unavailable for the best fingering of the second note—the B♭—also No. [*2*] fingering. There was one completely satisfactory solution possible due to ample rests before and after these four important notes. These rests enabled the player to pull out the center joint about ⅛ inch. This brought the B natural down to the correct pitch and still preserved the best quality, with No. [*1*] fingering. The right index finger was thus free to produce B♭ by fingering [*2*] which is far superior to [*1*] in quality. In this way

all four notes sounded at their best. At their conclusion there was time to push the center joint together again before the next entrance. By knowledge of his instrument, a little ingenuity and the will to do his best this man night after night played a beautiful four-note introduction for the singer. Many similar problems can be worked out with a little thought by the player who has complete technical equipment.

The clarinet has the unfortunate natural tendency to be sharp at the bottom of the register and flat at the top. In other words the extremities are too close together. Alone this would not be so bad. But the flute has the opposite fault. Its extremities are too far apart, and flute and clarinet often play unisons and close intervals. The error in the flute is not as great as the clarinet, and because it is a more flexible instrument, a good flutist can correct most of this error with his lip. The two instruments are at variance in another way. The flute is flat in *pp* and sharp in *ff*. The clarinet becomes sharp in *pp* and flat in *ff*. The reason is that when blowing harder for more volume the player senses the choking of the reed and instinctively or deliberately relaxes his lips to let more air through. This relaxation lengthens the free pendulum of the reed tip. Being longer, it vibrates more slowly and the pitch is therefore lower. Conversely, in *pp* it is less physical effort to pinch the lips a little to cut down the tip opening and thereby the volume, than to lessen accurately the tension of the much larger muscles that deflate the lungs. It is a lazy man's diminuendo. It makes the tone sharper than wanted by shortening the free tip of the reed. The tone is not only flatter with relaxed lips, but the quality is not so good. When pinching to raise the pitch you can go beyond proper pressure for best quality. The tone will become thin, stri-

The need of different lip position and tension for each note in the register is another hurdle in the way of good intonation. The aggregate difference from top to bottom is so small that the adjustment between adjacent notes is very minute. Wide intervals are hard to lip correctly. Practice of jumps greater than an octave from all notes to all other notes should be in the regular schedule. It should be done slowly, each note being one or two seconds long. Finger and lip changes must be simultaneous for correct intonation.

Reeds differ in their intonation as in all other respects. When changing a reed the wise player asks his friends in the wood-wind section to report on its performance—whether sharp or flat and in what part of the register. They can also advise about the quality of a new reed better than he can judge it himself. The sound comes to them through the air, whereas he hears it largely by bone conduction to the ear.

Clarinets must be warmed to body temperature at all times. If the program calls for A and B♭ instruments, the one not in use can be hugged to the body under the coat.

Most A clarinets have tuning characteristics different from those of the B♭. They are progressively sharp in altissimo. Key 21—necessary on the B♭ to bring notes above C♯ up to pitch—should not be opened. This will lower high D, D♯ and E a trifle. Hole 2 can be kept almost completely closed, leaving just enough air space to make the node in the vibrating column. This will flat most of the high notes, varying in amount with each clarinet.

The general tone quality of the clarinet is beautiful throughout, but it differs so much, note by note, that a man with no sense of absolute pitch can identify almost any note played even by a good performer, by its quality. Here again the flute has a tremendous advantage with its nearly perfect scale. One of the most valid reasons for not allow-

ing transposition of A clarinet parts on the B♭ in fine orchestras is tone quality. Most tones in scales of many sharps are emitted through the keyed side holes, many of which are smaller than they should or need be, causing unnecessary stridence. The tones of the simpler flat scales usually employed on the A clarinet are most all emitted from the larger finger holes. These tones can be "voiced" by the fingers in many instances in slow passages. Some sharped tones on the B♭ instrument are brilliant to the point of shrillness. In a slow melody in which a good tone and a bad one occur successively, the good one should be dulled in any way possible to avoid calling attention to the bad one. Low D and C♯ provide a good example. The D, one of the most resonant of all, can be deadened by lowering the finger close to hole 4 without closing it. If this slightly flattens, extra lip pressure can raise the pitch, increasing the loss of quality, to the flattery of the poor quality C♯. Patient experimentation with each clarinet can help some spots of poor quality.

The term "uneven scale" refers to quality, not intonation. Tones can be bright, incisive, dull, stuffy, "tubby"; and louder or softer than their neighbors with the same air pressure.

It is customary for an orchestra to tune to the A of the oboe, at least in sight of the audience. This is a foolish relic of the earliest days when oboes and flutes were the only wind instruments in orchestras. Oboes varied so much in their primitive state of mechanical development, and reeds differed so much that it was logical for the violins to tune to the oboe. The violin, of course, has more tuning flexibility than any other instrument. Oboes were improved, and less flexible instruments, especially the clarinet, were added to the ensemble. Tuning to the oboe remained only a habit that was hard to break. The oboe is

very flexible. By his lips alone the player can raise or lower the pitch several vibrations on any one reed. Reeds are frail and are changed much more frequently than on the clarinet, and they differ much more than do clarinet reeds. Behind the scenes, many orchestras today use a metal tuning bar suspended above a small wooden box which acts as a resonator. This metal bar changes very little with temperature and not at all with humidity. Its pitch is practically constant. It is the best thing yet developed for establishing correct pitch.

Almost anybody can tune one note of his instrument to the corresponding note of any other instrument. But what of the rest of the notes of the scale? This question prompts the furious "noodling" in every symphony orchestra as the oboe sounds the A. Maybe because of the temperature of the hall, or of the characteristics of his reed, the clarinet player finds he must pull or push the joints of his instrument a trifle to put his A below or above that of the oboe, when blown normally. He will then rely on his lip, and even fake fingerings, to "favor" certain tones to make a correct scale. To make sure, he runs up and down scales and arpeggios in all keys containing A to test the intervals in the same way and for the same reason that a piano tuner frequently lays down his hammer to test his work up to that point and to refresh his ear, which becomes fatigued easily—"tone tired"—just as the eye is fatigued by too constant use. All the players "run over" their instruments for the same reason—to see how the oboe A fits with the tuning of their whole range. Even the oboist ranges up and down, for his own benefit. Only by hearing intervals can the human ear judge intonation. It is silly for any group to tune to the A only. Three seconds after starting the first number many discrepancies may appear.

In a concert band it is customary to tune to B♭ (concert),

for it is an open tone (i.e., produced without pressing down any pistons) on all brass instruments. This tone is also better for clarinets, both in quality and in stability of pitch.

* * * * *

When all the special faults of intonation and scale of a particular clarinet have been determined and the owner has learned to correct them as much as possible with lip and fingers, he still will not be satisfied—probably. His last resort is to "carpenter" the instrument itself. *It should be the last resort.* The urge to tinker is strong in most people. Giving in to it completely may bring on a lot of trouble. It is much easier to make a clarinet worse than better.

The pitch of a note depends on two principal factors—the length of the vibrating column of air, and the size of the hole through which the note emerges. The former determines the rate of vibration. The latter determines the rate of emission of air. A small hole acts as a brake, retarding this emission and thereby flatting the note. The length of the air column is calculated from reed tip to center of side hole plus the distance from the bore through the side hole to the free outside air. Notes under keys can be raised somewhat by allowing the keys to open farther. Thinner pads or thinner bumper corks under the key arms will accomplish this. If this does not sharp the note sufficiently the next step is to undercut the hole; that is, taper its parallel side on the *north* (toward the mouthpiece). This moves the center of the hole north, actually shortening the vibrating column and raising the pitch. It is dangerous to enlarge a covered hole all the way to the surface, for this alters the tone hole rim, which is the pad seat. If it is done a new pad must be put on. The old one will

not have the resilience to adjust to a new seat. Without precision machinery it is difficult either to enlarge the diameter of a covered tone hole evenly, or to countersink the rim. Either operation sharps the note. Finger holes can be enlarged all the way to the surface. Finger tips are so flexible they will cover airtight even though the tone hole rims are uneven.

For undercutting a tone hole, insert several thicknesses of tough paper in the bore to protect it from damage. Use a rat-tail file, or a half round one, with fine teeth. Hold it at an angle to prevent touching the outside surface. The bore permits only about a half inch of motion, but it is plenty.

Notes that are too sharp can be brought down to pitch by a lining of stick or flake shellac applied by a hot nail or similar tool. The hole should first be wiped with a rag dipped in alcohol to remove any grease that might prevent sticking. One or more thicknesses of ordinary surgical tape can also be used to line the hole of a note that is too sharp or which needs the quality deadened. This requires no heat and it can be removed easily at any time to restore the hole to its original condition.

Any such alteration of notes calls for skill, judgment and restraint. If you do too much and begin to upset the tempered scale you will be in continual trouble. Every note you "fix" because it sounds wrong in a certain group will make other notes sound wrong in other groups. If you have a cheap clarinet and don't care what becomes of it, fine. You will get a lot of fun and information "monkeying" with it. But the chances are against you that you will actually improve the general intonation. One thing is especially important. Most side holes are used to emit a tone in both lower and middle registers, the interval of a twelfth

apart. If the two notes of this twelfth are both flat or both sharp, they can both be fixed by altering the hole. But if the twelfths are too close or too far apart it would be wrong to change the hole. The two notes must be altered by special or "fake" fingerings to achieve the desired pitch. Before you start to fix a note be sure you are not thereby spoiling still more its twelfth.

The worst spot on most clarinets, and therefore the most tempting, is the [*1*] fingering for low B natural. F♯, top line, and high D♯ also use the same fingering. The interval of a 17th between the extremes is notoriously bad on all clarinets. With the middle one of the three in correct pitch, the high note is sure to be flat, and the low one is almost always sharp. So far manufacturers have been unable to correct this serious fault. All the player can do is make one of the fingerings correct for the low B and the other one correct for the F♯. It seems preferable to produce the low B by [*2*] and the F♯ by [*1*].

The foregoing pages deal with trouble encountered while playing at "normal" pitch, which is supposed to be 440 vibrations for the A above middle C at 70 degrees Fahrenheit. This pitch is seldom held for any length of time due to varying factors of temperature and humidity which have great influence. The finest symphony orchestras change several vibrations in the course of a concert, often without realizing it. Departures from this normal pitch add to the troubles of clarinet players. Violins like to play above pitch. It gives greater brilliance both to cheap fiddles and to fine old violins that have lost some of their sparkle and resilience through age.

When a player "jobs around" under all conditions he encounters a great variety of pitch, especially if a piano

is used. Pianos are the greatest single obstacle to good intonation in the orchestra. They are to be found as much as a half step higher or lower than they should be. They are completely inflexible, and must either be deferred to or ignored, depending on their importance in the program at hand, and on the possibility of actually meeting their pitch. The clarinet is the least flexible of all instruments except the piano. Lengthening the tube by pulling out the joints, or shortening it by means of a short barrel will accomplish only a slight change. Any such alteration of the air column destroys the proportion of the accurate measurements used to locate the holes. Change in the barrel length affects all notes somewhat, but it affects most those which are nearest the mouthpiece. B♭, middle line, uses only about one-fourth of the tube. It is therefore raised or lowered by changing the barrel length, four times as much as the B natural just above it. A barrel one-half inch shorter than standard would actually pitch this B♭ above the B natural. One-fourth inch is the maximum that the barrel can be altered and still retain some semblance of a scale. This much, or even less, requires adjustment of lips, fingers, and of the other joints of the instrument if that is possible. If the barrel is pulled out, the error can be distributed into three zones by pulling also the middle joint as much as 3/16 inch (except on clarinets equipped with the articulated G♯) and the bell joint up to one-fourth inch. At slow speed careful lipping can further correct some of the error that remains. Fake fingerings can help too by extra venting of flat notes and by reducing the venting of sharp notes.

For high pianos a barrel as much as one-fourth inch shorter than normal can be used. This will upset the scale the other way. It helps a great deal if a sixteenth inch is

cut off the top of the lower joint, and a quarter inch from the bell. Again, the error is distributed between three zones. The lip can then help to spread the remaining discrepancies more widely and evenly.

CHAPTER XXV

SLURRING

IT is much easier to slur upward for two octaves or more than to slur down one octave. Weber makes startling use of this principle in two places in the first movement of his Clarinet Quintet, Opus 34. There is one slur of three octaves and a minor third, from low E to high G. The other slur is of three octaves, from low F to high F. Both of them are sensational, and sound very difficult, but they are not. Any good player can play them easily with a good reed.

In going up, the lip clamps the reed, instantly, tighter to the lay. This is a definite force. In slurring downward over a wide interval there is no outside force to help change the vibration rate. The lip can only relax and allow the reed itself to lengthen its free pendulum, while still vibrating. This requires a longer fraction of a second than if it were helped by some outside force. Some help can be given to it by relaxing the throat as for singing a low note, at the same instant the fingers move. This helps prevent squeaking into a high harmonic. Lessening the air pressure at the same instant also helps. Sure prevention is obtained by tonguing the low note, where a possible squeak would be disastrously prominent. When the reed has been thus

stopped completely, it resumes vibrating at the new length and rate more readily and quickly. Also, the time required for tonguing enables the lip to make a more accurate adjustment to the new tension without any suggestion of a glissando. Wide slurs can be improved with the right kind of slow practice. Chromatic and diatonic scales in single and double octaves, at a rate no faster than one note per second, are fine for that purpose. Special attention to lip and air pressure will improve the legato, but fingers must be accurate too. One delayed finger can spoil an otherwise good slur.

CHAPTER XXVI

ORNAMENTS

Grace Notes, Trills, Turns

MUSIC is ornamented with "figures" of various kinds, much as buildings, wall paper, clothing and most other human appurtenances are ornamented. There are many kinds of musical ornaments. Few of them are played according to rigid rule. Most of them are largely governed by the whim of soloist or leader. Originally many of these ornaments were merely suggested by symbols, and individual artists used their own ideas of interpreting them. The resultant confusion over the intent of the composer led to gradual abandonment of symbols, until today complete notation is the rule. Serious music for the clarinet did not appear until the closing years of the 18th century. Players are thus spared the confusion of many earlier controversial forms. It is sufficient here to consider three main varieties of ornaments. They are—the *grace note* (appoggiatura), the *trill,* and the *turn* (grupetto). These three classes of figures can be played anywhere in the range of the piano and violin in any key with equal ease and beauty.

The same is not true of the clarinet. Unfortunately, technical difficulties prevent good trills and turns on a number of notes. Grace notes are least affected. Some composers know what notes to avoid. Others don't always know. Sometimes a transposition from the original key to meet the voice range of a singer throws a trill or turn into a bad spot of fingering. This can often be dodged by playing the passage up or down an octave, if the ornament is considered more important than the register. Otherwise if a respectable fake fingering is impossible, the ornament had better be omitted. An embellishment must be beautiful and effortless, and secondary in importance to the main notes of the melody.

* * * * *

A grace note is an extra note (or notes), added to a measure already complete in time structure. Since no time is allotted to it, time must be stolen for it from some other note. Grace notes are of two kinds, short and long. The short one is the most common, and it is the only one being written today. It is placed just ahead of and close to the note it embellishes. It is printed distinctively smaller than the notes in the regular time scheme, enabling the eye to recognize it instantly as an extra. It has a stem and flag, and a diagonal line cutting across them. It must be played as quickly as possible without any definite computation in terms of beats. It can be played either on or just before the exact time its parent note is scheduled to start. A group of two or more notes are always of the short variety, but there is no diagonal line across the stems. The leader will say whether grace notes are to be played "on the beat" or "ahead of the beat."

The long appoggiatura is also a small note with small

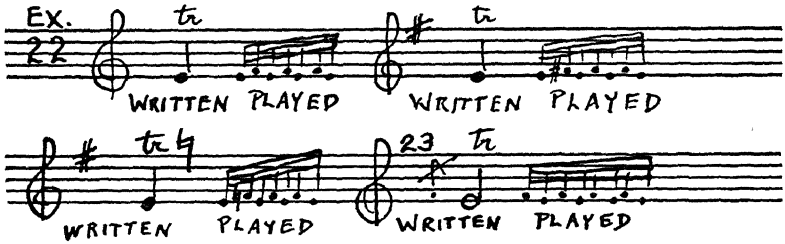
stem and flag but without the diagonal line. It gets half the time allotted its big note. Thus in 4/4 time at four beats per measure, in Ex. 21 D gets two beats and C gets two. A and G get one beat each.

Although the long appoggiatura is not written now, much early music, especially of Mozart, employed this system of notation, and players must be familiar with it. Where the intent of the composer is in doubt, the leader announces in advance, "short appoggiatura" or "long appoggiatura." The long one was really of the classical period of music. In later romantic music, soloists took more liberties with ornaments. Composers stopped this by writing out all notes so that their intentions could not be misconstrued.

* * * * *

The trill is an ornament formed by rapid alternation of a printed note with the one above it, which is not printed. The trill is indicated by the letters *"tr"* printed above a note to be trilled. A *minor* trill is one-half step up. A *major* trill is one whole step up. The choice is not the player's. The rule is to trill upward to the next scale step in the key being used at the time unless an accidental is printed beside the letters *tr.* This accidental applies to the upper, unwritten note of the trill. Thus in the key of C, E is trilled up to F natural. In the key of G, E is trilled up to F♯ because F is automatically sharped in the key of G. If, however, there is a temporary modulation to some chord using F natural, the trill of E in the printed key of G will

be indicated—*tr* ♮. In this case E is trilled to F natural. In other words, upper notes of trills obey key signatures and accidentals just as printed notes do. A trill always commences with the printed note unless a grace note precedes, when the grace note is played first.



If several notes in a row are to be trilled, the letters *tr* are followed by a wavy line—*tr*~~~. Each note under this wavy line is to be trilled throughout its time value upon being attacked. If there is a slur mark connecting the notes, in addition to the wavy line, both tone and trill must be continuous. This is more difficult to do correctly. Each note must start and stop on the printed note itself, for to move directly from the upper (unprinted) note of a trill to the next printed note gives too much prominence to the upper one and tends to obscure the principal note.

In other words the ear must hear G at the beginning and end of the first quarter note, C at the beginning and end of the second quarter, etc. If the same passage is not slurred, the interruption of the pattern by stopping each note to tongue the next, covers up small discrepancies of

note spacing in each separate trill. The ear is tolerant of greater variation of space between quarter notes than of small notes within each quarter. The player can elect to use 5, 7, 9, or any other odd number of notes in each trill according to the time at his disposal. He can stop easily and with certainty on each base note before attacking the next. But if the passage is slurred there are no such periods of grace, and the spacing of the whole into a rhythmic pattern of beauty is more difficult. Trills must be even and fast. This is hard to do on some notes and in some keys. If they are uneven and sound labored they should be omitted. The upper note is ornamental, hence secondary in importance to the printed one. It must not be more prominent than its base note, either by duration or incisiveness. Omitted trills will not cause discomfort to the ears of even trained musicians, but bungled trills that upset the real pattern of the printed notes will.

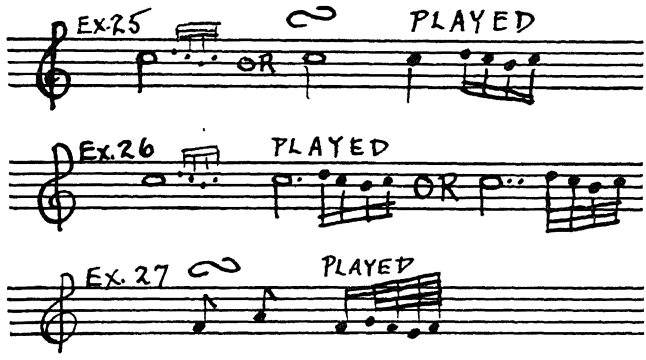
Trilling a long note is simple—just do it as fast as you can. If the note is held so long that the trill becomes monotonous, it can be started slowly and accelerated to the end, to add variety. Short notes require judgment as well as nimble fingers. In 2/4 time, where there are 120 quarter notes per minute, eighth notes are ¼ second long. If one of these eighths is trilled only once three notes are required and they can each be only $\frac{1}{12}$ second in duration. This is not really fast for trained fingers. But to trill one of these eighth notes twice makes a group of five notes, all played in ¼ second. This speed is usually prohibitive in repeated notes using the same fingers over and over, though twenty or more notes per second are possible in straight line passages where the different fingers relieve each other. Following this line of reasoning, if a quarter note = 90, the eighth notes are only three per second. A single trill would

use a speed of only nine notes per second, which is too slow to be good. Two trips upward to trill an eighth note would employ five notes at a speed of fifteen per second. This speed is easily possible on most notes, and is much more enjoyable to the ear than the slower speed. In the case of several trilled notes in a row it is well to slow down the easy ones to the practical speed of the hard ones to preserve uniformity. Again, it is experience and musical taste that count when playing beautiful trills.

* * * * *

The turn is composed of four notes played immediately following the parent note. These four notes are: 1. the note above the parent note in the prevailing scale, unless altered by a written accidental; 2. the parent note again; 3. the note below it; 4. the parent note again, for the third time. They are either written in miniature to show that they are extra and have no time provided for them, or they can be merely indicated by the symbol ∽. A great difference of opinion has developed as to how they should be played. Players, leaders, teachers and books on music are not in accord. In actual use, soloists and leaders decide how they are to be played. As with grace notes they must use part of the time prescribed for the parent note which precedes. Exactly how much this should be is the question.

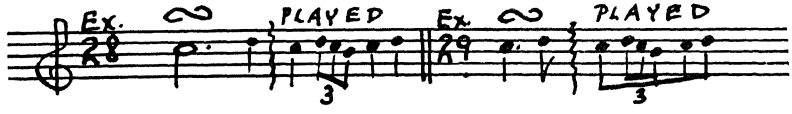
Grupetti are of two kinds. The simpler one, following an undotted note, generally uses half its time values. (See Ex. 25.) If the note is of several beats duration, the turn is frequently played in the time of the last beat, or last half beat if the time is slow. In Ex. 26, the dotted half note is held for three beats and the four sixteenth notes occupy the fourth beat in the first illustration. In the second one, the double dotted half is held for 3½ slow beats and the



four notes of the turn become 32d's to occupy the last half beat of the printed whole note. Notes intended to be played slower than four or five per second are seldom written as a grupetto because of conflicting interpretations. Such notes are written full size and the desired time allotment is provided for each in the measure. This custom is being adopted universally for all notes today.

Turns occur also in much shorter notes up to the limit of finger speed, as in Ex. 27.

The other type of turn follows a dotted note. It is a little more difficult to understand and to visualize just before playing, but at least the time scheme is definite and always the same. In this type the turn is played between the note and its dot. In other words the time for it is taken from the note itself and the dotted part is given it full time as though there were no turn.

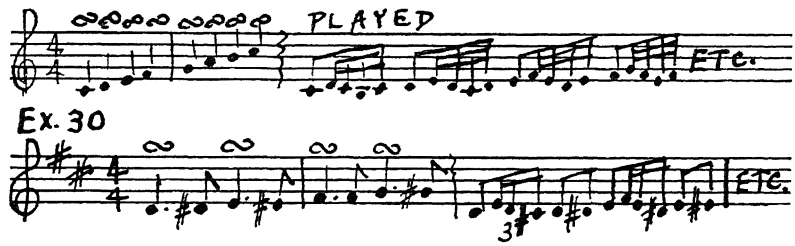


Stated another way, the dotted note is broken up into three equal parts (See Ex. 28.) Part 1 is the note itself—

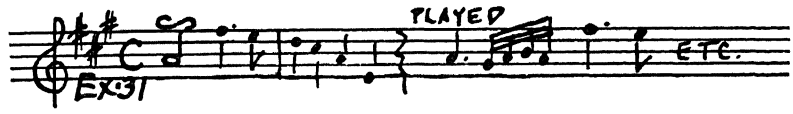
a quarter note. Part 2 is a triplet of eighth notes composed of the note above the parent note, the parent note itself, and the note below. These three eighths, of course, are played in the time of one quarter note. Part 3 is again the parent note played where the dot is, on the third quarter. This same proportion of time allotment prevails in any similar group. The same figure twice as fast is written and played as in Ex. 29.

One of the most controversial points of the turn is the pitch of the note below the parent note. When the note to be turned is the first or fourth scale step, the note below it is naturally only a half step away. When the fifth scale step is turned, the lower note is invariably raised by the necessary accidental to bring it up to within a half step of it. But whether to raise the lower note, when the other four scale steps are turned, is a matter of constant argument. In early classic music it is usual to leave the lower note a full step below the parent note. In more modern music the opposite is the unwritten rule. The soloist or leader is the final arbiter.

It is not the purpose of this book to try to explain *why* turns are written and played as they are. Explanations are in great detail in many musical dictionaries. We are concerned only with the problems of practical clarinet playing. The two main types of grupetti occur frequently in music and the player must be prepared to execute them at sight. Excellent preparation for this is the practice of scales in all keys with each kind of turn on each scale step while preserving a rigid tempo. Hard spots should be singled out for as much repetition as needed to make them as fast and as smooth as the easier groups. Once understood thoroughly, turns are not difficult to play at reasonable speed.



On rare occasions a turn is inverted—the first small note being below the parent and the third one above. The symbol indicating this is supposed also to be inverted, but there is the same carelessness in its use as in the case of half rests and whole rests. Sometimes a vertical symbol is used for an inverted turn like a tall, thin capital S. Probably the best known inverted turn occurs in Rienzi Overture. It is usually played in the time of the second half of the second beat, furnishing good proof of the lack of any set rules governing time allotment for turns.



CHAPTER XXVII

DYNAMICS—PHRASING

PROPER volume of sound to employ is a chief concern of the player at all times, whether in a solo, in full orchestra, in small orchestra, in chamber music or in band. Correct volume will differ from day to day and from moment to moment, depending on such variables as size of hall (and whether it is full, half full, or empty) the number of players in the group and the volume they employ, the position in the range of the instrument—whether high or low—the importance of each note, measure or phrase to the composition being played, etc. Melody must always be heard. If it is not, it is no longer melody but merely one ingredient in a mixture of sound. Keep alert for the relative importance of your part in relation to others. If a few notes look or sound like melody or counter melody, play louder in spite of dynamic marks to the contrary. Printers are often wrong. Don't hesitate to alter expression marks if it will improve your product. If you have something important and the accompaniment is too loud, play *pp* so that you cannot be heard at all. This usually prompts the leader to demand less of the others, and you can then play normally. The instant you hear some other instrument take the melody or other important part away from you,

cut down your own volume to give him a chance. Maybe he wants to, or should, play the melody *pp*. He is boss for the moment. Your accompaniment part must be under his. In complex contrapuntal music such as the Meistersinger Prelude it is impossible for one leader to indicate dynamics to each man or group all the time. A dozen leaders could not do it. Routined players know in advance in familiar music and can sense in a new composition, the relative importance of each measure or group of notes, and they will employ dynamics accordingly. One of the worst distinguishing traits of the tyro is to play easy parts loud. He does it because they are easy and he wants to tickle his ear with his own product. The old saying is: "Anybody can play loud. It requires a musician to play softly." To which should be added: "It requires an *experienced* musician to know *when* to play loud and *when* softly." The marks of *p* and *f* are not in themselves sufficient. They are very flexible in meaning and in use. They are largely precautionary, indicating a change of dynamics in *direction* rather than *extent*. No table of decibels for the various marks has ever been compiled. Suppose there is a solo passage in orchestra marked *p*, with a diminuendo a few measures later on. If your reed is a little stiff or balky it is better to start a little louder and make the diminuendo safely, than to start with a delicate *p* and then not dare to diminuendo for fear of the tone stopping entirely. The diminuendo is something tangible that the composer had in mind and wanted. He also wanted the whole thing played softly, but there was no way for him to decide or to indicate just how softly he wanted it. He had to leave that to the artistry of the player.

If you and the flute or oboe have answering notes or melodies, balance your dynamics with this other instrument

rather than insist on a purely fictional *absolute* value of *p* or *f*. Teamwork comes first.

The "weight" of a note depends on many factors. The word is carefully chosen as being outside exact musical nomenclature. Weight is the combination of loudness, duration, position in the staff, position in the register of an instrument, the method of starting it (whether staccato, or slurred to from the preceding note), the method of sustaining it (diminuendo, crescendo or level), etc. Any or all of these factors are in turn balanced against the weight of sound being produced by other instruments at the same time, and all of them vary momentarily.

Just plain loudness is easy to understand and calculate. The relative incisiveness of different parts of the clarinet register is quite another matter. The extreme low tones sound loud when heard close by and especially if alone. They are easily covered up by other instruments and they have none of the penetrating and carrying qualities of the notes in the second and third registers. If for some reason a man is asked to play a low melody one or two octaves higher than written, he must cut down the volume considerably to retain equal weight in the ensemble. A sharp staccato emphasizes a note. Repeated rapid staccato of the same note is more prominent than the same note sustained at the same level for the same amount of elapsed time, even though the actual duration of the note within that time is less, due to the interruptions of the tongue.

In Ex. 32, the top C is so incisive by reason of its position in the scale and in the clarinet register, that it needs to be played more softly than the first and third notes in order to have the phrase sound smooth and musical. Although softer, it will still be more prominent—have more weight—than the two lower notes which are louder. The lower C

can hardly be played too loudly, yet to the listener the effect of the crescendo is as indicated because of the prominent quality of the higher C. If the phrase is inverted as in Ex. 33, artistic rendition is much more difficult. Attack of any note *pp* above the staff requires skill and a good reed, and the difficulty increases rapidly the higher up in the scale it is. In this illustration the first note will inevitably be too prominent because of its incisiveness. The second note must be really fortissimo if it is to fulfill the composer's requirements of being the climax of the phrase.

Careful analysis similar to the above must be employed constantly by players if music is to have beauty and life. Inflection is as necessary as in speech. Playing music in a monotone is as deadly as speaking in a monotone. Since music is a less tangible speech than a language, rules for music expression are harder to formulate. For this reason the fifty best violinists in the world will play the same composition differently, but still beautifully. In the course of his long training each listened to masters of the instrument and compared their styles of playing. Each adopted some traits and rejected others. Eventually through evolution each developed a style of his own, but no one could ever know it by looking at the printed music. All of them use the same, but all of them sound slightly different. It would be a severe task to describe the differences in mere words.

The first note of most slurred groups is the most important and requires emphasis, either for the melody line,

or to etch clearly the time pattern. Dynamic accents are all right, but there are times when a more subtle emphasis is welcome if for no other reason than variety. This is accomplished by *duration* of the first note, i.e., by stealing a very small bit of time from the next note or notes of the group and giving it to the first one. This discrepancy of time value would be impossible to measure when played by an artist, yet the ear hears the time scheme punctuated even though all notes are of equal loudness. The effect is very pleasing. This is often called *leaning* on a note. This first-note emphasis through time discrepancy is automatically taken care of when there are only two notes in the slurred group. Stopping and re-starting the tone requires measurable time. This time must be taken from the end of the last note of each group. The first note is consequently longer than the second even though it occupies exactly the time allotted to it. It is more prominent even though it is not louder. Tonguing it of course adds to this prominence, though a soft staccato "more air than tongue," can be used to minimize the incisiveness of the ordinary attack. Slurs of three or more notes can be "pointed" by a great variation of this principal of emphasis by duration, according to the needs of the music.

Accidentals in a melody line are usually passing notes that do not alter or conflict with the prevailing chord or key. The burden of a modulation or key change generally rests in the inner or harmony voices. Any altered note in these inner voices is therefore very important and should be emphasized, by dynamics and duration, to assure the ear it is not a mistake. If played lightly and hesitantly it is likely to sound like a wrong note in a chord or key that the ear and mind have just been accustomed to. Emphasis on

the new strange note is necessary to move, or even startle, the ear into acceptance of a new key. The amount of emphasis necessary to accomplish this is in direct ratio to the "radicalness" of the modulation.

CHAPTER XXVIII

TRANSPOSITION

TRANSPOSITION consists of seeing one note and playing another at some desired interval above or below it. The reasons for, and the uses of, the practice are many.

The first clarinet in use was pitched in C. On it the performer could play from vocal, violin or keyboard music, just as it was. There were no keys for chromatics. Clumsy cross- or forked-fingerings for sharps and flats limited the player to the three simplest key signatures except at very slow speed. To overcome this, instruments were built in various keys. With them the player could finger the simple scales, and yet produce any key the composition called for. This meant an investment in many clarinets which were a nuisance to carry around and to keep warmed to the proper pitch. As mechanism improved and players became numerous and therefore more proficient through competition, the need for all of these clarinets was eliminated. The only clarinets in use today in this country are pitched in B♭, A, and E♭. But much old music remains in the standard repertoire. To play it, transposition is used frequently. In addition, on routine music jobs in small orchestras, clarinets are often given parts for missing instruments that require transposition.

All of these present day clarinets are *transposing* instruments. That is: any note on any of them is of a different pitch from the note of the same name on the piano. Music for clarinets is *transposed* to the keys that will nullify this discrepancy between them and *concert* key. Any transposing instrument is named by the note produced when its own C is played. Thus, middle C (fingered 1, 2, 3, 4—see Chart in Part II) sounds B♭ on the B♭ clarinet. It sounds A on the A clarinet and E♭ on the E♭ clarinet. This nomenclature is necessary. It is obvious that a man can learn and keep in mind only one set of finger positions.

The C clarinet was the last to be abandoned in this country for regular orchestra use. Few professionals own one nowadays. Its tone is a little too bright and trivial to mix well with strings. Many parts for C clarinet exist in early bel canto Italian operas. They are all played today on the B♭ instrument.

Many players today do not own an A clarinet. Those who do own one use it infrequently, except in the best symphonies where conductors insist on it, because of its slightly different tone quality. Any person with good basic technic, especially in keys of three or more sharps, can play most A clarinet parts on the B♭ with comparative ease. The advantages are many. It means keeping only one instrument warmed to the temperature of the breath, simplifying tuning problems. Music for shows, operas, and even symphonies is often shortened by a *cut* which can vary in length from a few notes to several pages at a time. Such a cut can jump across a change in clarinet from A to B♭ or vice versa, for which the composer originally planned and allowed time. Often without even the time involved in tonguing, a player has to slur from one note on the B♭ to a note on the A. If he cannot transpose he has to omit

several notes or measures while changing the mouthpiece from one clarinet to the other. This damages the product of the group, and is poor publicity for the player. Aside from the stimulating mental exercise, playing everything on the B♭ is excellent finger drill. On steady jobs where there is little time for private practice, performers lose quickly their command of the sharp keys if they use the A clarinet wherever indicated on the score. Most A clarinet parts are in one to three flats.

Some people are born with the ability to recognize the pitch of a single note as surely as they can recognize a color. This is called absolute pitch. This ability cannot be acquired, though it can be developed more strongly in a person who was born with it in small degree. There seems to be no explanation for it. It can be present in all degrees of intensity. Those having a strong sense of it can name a note instantly if suddenly awakened from sound sleep. Others have to think for a second or two even if wide awake. Many fine musicians have no gift of it at all, while many mediocre musicians have it strongly. It is of doubtful value to a player of a transposing instrument such as a clarinet, and at times it can be a real detriment. To an orchestra player who uses only the B♭ clarinet it is a burden, for his mind and ears must be able to shift quickly back and forth from the sounds of the B♭ and A, and occasionally the C, clarinets and to feel them only in their relative positions in the scale. Any absolute placement of a note would require mental effort akin to translation in a language. A successful transposer must feel, and think in, the new key, rather than have the printed key in his mind and be compelled to project it in the new key by conscious effort.

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Methods differ in effecting the A to B♭ transposition. Some players merely flat every note they see. Double sharped notes become single sharped. Sharped ones must be played natural. Naturals become flats, and flats are double flats. The written double flats become minor thirds—a mental hazard at any speed. This plan is simple and uniform, but difficult in application. It is perhaps best for the quick thinker who is not so well trained technically. For the thorough technician there is another method in wide use that is very practical. In it, music in the key of C is flatted as in the plan first mentioned. In other words play it in the key of C♭ just as though there were seven flats in the signature, and lower all accidentals a half step. With few accidentals on the page it is a simple matter for a good set of fingers. *For music written in all other keys:* Read each note as if it were the note below, and let your fingers automatically supply the sharps in the new mental key. For example: Nearly all A parts are written in 1, 2, 3, or 4 flats. If the key of F (one flat) is before you, *think* in the key of E—4 sharps, and read each note you see one note lower. If you think 4 sharps and have good basic technic in that key, your fingers will subconsciously sharp F, C, G and D while your eyes see G, D, A and E, the step above. Similarly, when the A part is in two flats, you play in three sharps. Three flats become two sharps, and four flats become one sharp.

Learning to do it is not nearly so hard as the explanation sounds. To learn it, start with simple melodies. By using familiar ones at first the ear can detect mistakes and corrections are simple. But this leads to transposition more by ear than by eye. In the orchestra instinct is not greatly helpful. Instead, it is a matter of cold calculation. After a few familiar melodies have established the system in your

mind, it is better practice to transpose unknown melodies. If a mistake is suspected, play the melody as written to enable the ear to detect it by your sense of relative pitch. This ability to detect intervals by hearing them is developed by sight singing, a very necessary part of the training of any good musician. This transposition really amounts to a knack which may come to you suddenly like the ability to ride a bicycle. Once acquired you are limited only by your technical command. There will be many awkward groups in 4, 5, and 6 sharps. The two little fingers will run headlong into slides more frequently because the mind is busy with the actual re-reading of the notes in the lower position and cannot plan the fingering ahead so well. But there is usually time to look over the bad spots in a program and to work out and even mark on the parts the best fingerings. There will seldom be many such places for the thorough technician. It is entirely practical to play on the B♭ clarinet all the A parts in Scheherazade, Mignon Overture, Deems Taylor's Looking Glass Suite, the Liszt Sixth Rhapsody, including the cadenza, and most other major compositions. The short solo in Semiramide Overture has long been a famous test of transposition proficiency. Good players do transpose it. Some things are of course too difficult. On the border line is the Saint-Saens Tarantelle for flute and clarinet. It is doubtful if this number can be tossed off as nonchalantly as it should be for the proper effect on the B♭. But it is wonderful practice to try.

Seldom are there passages written for A clarinet in many sharps. The few to be found are transitory and short. In them the burden is taken from the fingers and put on the mind, for three to six sharps on the A mean four flats to one flat on the B♭ instrument, all of which are physically easy. The mental hazard is the result solely of the rarity

of the occasion. There is not enough music written for sharps on the A clarinet to provide routine experience in playing it on the B♭.

Other transpositions are in less common use. Principal of these is raising C parts a whole step. C parts include music for piano, violin, flute and a few C clarinet items. The method is to read each note a whole step higher and add two sharps to, or subtract two flats from, the signature. If the music is written in the key of C it must be played in the key of D—with two sharps automatically used. Music in the key of E♭—three flats—must be played in the key of F—one flat. If you see A, play B; if E, play F♯. In other words mentally read one step higher (or one letter farther along in the alphabet) and physically add two accidentals *northward.* It is not very difficult except that in sharp keys, the two extra sharps can bring on finger problems. The mental difficulty is to read *up.* Players who do a great deal of A to B♭ transposition develop the habit of reading down one step. It requires alertness to keep the mental gears shifted into the "up" position.

Religious broadcasts frequently call for C transposition, by using identical piano parts for the orchestra, for hymns. Each man makes his own transposition where necessary. The rule is "Play what you see but don't hear." In other words, reinforce inner voices when they are weak, and "change lines" immediately if what you are playing becomes too prominent.

The viola is a non-transposing instrument in C, but music for it is written in the viola or alto clef to avoid a confusing number of added lines below the staff. Middle C is on the middle line. To play its music on the B♭ clarinet each note must be raised a whole step, requiring as usual two more sharps or two fewer flats. The bass clef is more familiar

than the viola clef to all but violists. Therefore it is easier for the clarinet player to read viola parts *as is* in bass clef, keeping the new signature of two northward accidentals in mind. Middle line is C. Read it as if it were bass clef. Call it D. Reflexes will of course finger it as the regular fourth line D in treble clef, which sounds an octave higher than the viola would play it. Such transpositions are only emergencies anyway on "business" jobs, and the switch of octaves would do no harm. Also, any clarinet player good enough to play from viola parts would have little trouble switching to the correct octave if his notes sounded too high.

Bass clef instruments are non-transposing. If you play from such a part, add two sharps or subtract two flats as usual and read a fourth higher, as though it were treble clef. For example, the middle line in the bass clef is D. On your B♭ clarinet you must play E to match it—on the fourth space of the staff. This space is the interval of a fourth above the printed note you are transposing. Reading up a fourth is also necessary when playing alto or baritone saxophone parts on the clarinet. The difference in the saxes is that you must either add one flat to the signature or subtract one sharp.

It is too bad that the tenor clef is so seldom encountered by clarinetists, for playing from it is the easiest of all transpositions. Middle C is on the fourth line, corresponding to D in treble clef. So just read each note as is, and add two sharps or subtract two flats as for all other C instruments.

Once in a very great while a player will encounter parts for clarinets pitched in D and in F. They are to be found only in foreign publications of old music. The D parts must be transposed up a major third, adding four sharps

to, or subtracting four flats from, the signature. The F parts must go up a fifth or down a fourth, adding one sharp to, or subtracting one flat from, the signature.

Facile transposition is of great advantage to the player who encounters a large repertoire. He needs to have many technically hazardous numbers "under his fingers." Many of them are unplayable at sight, from the standpoint either of reading or of finger planning. While symphony conductors usually demand that lyric or dramatic passages, relying mainly on tone, be played on the pitch of clarinet called for by the composer, in fast technical work they would rather have clean execution on the instrument preferred by the player. A famous example is the difficult cadenza in Chaminade's Scarf Dance. It is written for the A clarinet, but many players prefer to finger it a half step lower on the B♭. The notes fly by so fast that surely nobody knows or cares which instrument they are coming from. Another instance is in Tschaikowsky's Mozartiana Suite. It is a cadenza, considered by many players to be the most difficult one for the clarinet in all musical literature. One edition in use in the United States has the part printed for A clarinet. Another edition has it for the C. It is obvious that nothing would be gained by compelling players to be ready at all times to play it on either of these two instruments. It is equally obvious that the composer did not write it both ways. The existence of the part for two different clarinets is due to two different publishers. The solution for the player is simple; learn to play it on the B♭. If it is not completely memorized, the mind can be refreshed during performance by a glance or two at the part, whether in A or C, and simple transposition.

In time, A to B♭ transposition becomes so completely subconscious that the player is apt to forget, during even

short rests, which clarinet he was just using. If he does forget he will make his next entrance a half step higher or lower than he should. It is essential for the transposer to have visual indication before him at all times of the key of the clarinet in use. Some publishers, especially foreign, do not make prominent enough the directions "B♭ Clar," "Change to A," etc. It is well for the player to mark all changes clearly, either by writing in large letters or by circling the printed marks with red or blue pencil. The first rule of transposition is that you must know *when* to transpose, *whether up or down,* and *how far.*

While transposition demands lots of basic technic, it also improves it. Playing figures in different keys often puts them in awkward finger combinations. Mastering these bad spots is of course very beneficial. On easy jobs it is a favorite sport of technicians to play all A parts on the B♭ clarinet, and to play all B♭ parts on the A clarinet. The latter is a real mental workout—reversing the usual direction of the transposition. It requires a quick mind, good fingers, and occasionally a lenient leader, to do it acceptably.

CHAPTER XXIX

CADENZAS

CADENZAS for piano or violin in important music are often major compositions in themselves. But for single-voice instruments such as the clarinet the cadenza is often a curious sort of musical weed that flourishes in out-of-the-way places, exhibiting its chimerical and short-lived beauty unexpectedly and often inexplicably between sections of the ensemble playing. A few of course are real contributions to the compositions in which they occur. Clarinet cadenzas in legitimate orchestra music are not numerous and many of them are not difficult, though they may seem to sound that way to the uninformed. A few of them are genuinely difficult. Part of the required equipment of the routined player is the mastery, preferably from memory, of the best known twenty or thirty of these.

It is in band music that "selections," "arrangements," "potpourris," etc., contain numerous cadenzas. And here the term "weed" can be most often applied with reason. Nevertheless they must be played, and as well as possible. Here is a very tangible application of the old rule, "It isn't what you do but how you do it that counts." Meaningless cadenzas can be turned into beautiful flourishes by fine playing. Cadenzas are written for purposes of modulation,

to provide a "change of pace" in the volume of sound, to exhibit the dexterity of the player, etc. There are only a few nebulous rules about playing them, and they are interpreted by each man to suit himself, if the leader gives him the reins.

Invariably a technical cadenza begins with a sustained tone to allow the actual reverberations of the ensemble and the residual impression in the ears of the auditors to subside so that attention can be centered on the soloist. For this reason it is well for the player to dwell on this first note for several seconds to attract attention to him, employing crescendo or diminuendo or both to break up monotony. There is often a more tangible reason for so doing. Many concerts are played without rehearsal. It is not at all uncommon for a solo clarinet to turn a page and find himself facing a cadenza he never saw or heard. By holding the first note he has a few seconds to look ahead and analyze his problem. Although a cadenza has no bar lines (usually), it must be divided logically into related groups for emphasis and for proper similarity of figures that look alike and should sound alike. Sometimes this emphasis is only in the mind of the player. A good example of this is in the second cadenza of the Liszt Second Rhapsody. The long descending scale from high F♯ can be played easily if the E, D and C♯ are thought of as pickup notes for the B, and if the remaining notes are accented—if only in the player's mind—in groups of four, with the note B starting the rhythmic pattern with the strongest accent. All music must be played with inflection in the same way that the voice inflects spoken words, although words are printed in the same size of type and with uniform spacing. Pick out the salient notes or groups and emphasize them by dynamics or duration—in other words by inflection.

For the moment the player is not obliged to observe the musical inhibitions of ensemble playing. He can pirouette and jump and glide and stop short like a ballet dancer. On all but well known pieces he can also improvise within reasonable limits, as long as he gets back to the right key at the end to lead into the next movement of the music. Essential for a well-played cadenza are a good, flexible tone, basic technic that can toss off conventional scale and chord figures as though they are merely tid-bits, and a flare for showmanship and the dramatic.

Chapter XXX

MUSICAL SHOWS

THE first that a musician sees of a new musical show is at the reading rehearsal where the manuscript is played for the first time to find the errors in "extracting" the individual parts for the various instruments from the composer's score. Pencil and eraser are as essential as an instrument. Most conductors play the music slowly and deliberately, without shading, the first time, listening for mistakes. When one is heard the orchestra is stopped at once, or if it is not bad or extensive, the leader makes a mark on his score and refers back to it when the number is finished. Then he calls out the proper notes and compares them with what he heard. Here the transposition for various instruments complicates matters. If he says "C concert" he means actual C, and players of transposing instruments make their own calculations. To the clarinet player the leader is talking about D on the B♭ instrument, or E♭ if the A clarinet is scored for at that point. A leader "talks concert" usually when he is reading from a piano or vocal score. In a reading rehearsal he uses the complete orchestra score. It is easier for him to say "written C" or "written F♯" when speaking to wind players. To the clarinet,

"written F♯" means actual F♯ on the page, although it sounds E concert if on B♭ clarinet, and E♭ if on A clarinet.

At a reading rehearsal a leader needs, and appreciates, attention and alertness more than instrumental finesse. When he stops abruptly, stop with him. It wastes time and frays nerves when players continue for several measures. Don't "noodle" on warmup exercises or other music. Play only when told. Remember that a reading rehearsal is only a proof-reading session, not a concert. Playing new music at sight is largely a combination of various reflex actions. A certain spot on the page means a certain combination of fingers, a certain lip tension and a certain pressure of air for a certain length of time. But a routined musician hears or feels in advance through eyesight, what he is about to play. Knowledge of the next few notes helps in muscle placement and in musical interpretation. Strongly developed, this intuition sometimes causes mental conflicts. Many chords can resolve in several directions. The player can easily expect a different progression from the one employed by the composer. Preoccupied with mechanical playing problems, he may be unable to conjure up the other notes of a chord that will fit those that he sees. He thinks they must be wrong. Torn between a combination of intuition plus his own preference in the choice of a progression, and what he sees on the paper, it often requires real mental effort and self-discipline to play the written notes. The rule is—"play the spots." He is sure to be censured if he injects his own ideas into a number. If he plays what is written and there has been a mistake in copying, he is absolved from any blame.

Once the mistakes in a number have been corrected the leader will then say "Now let's hear it" or some similar expression meaning—this time observe all expression marks

and make music, rather than just play notes. It may take several repetitions before composer and leader know just what they want, for the sound of the music in its orchestral dress is as new to them as to the players. In a show the music is usually subordinate to the stage business—singer, dancer, skit, etc. Often it is distorted beyond all musical sense to meet these requirements. Ballets have a habit of working faster than they estimate in advance to the arranger. This calls for simplification of musical figures—changing 16th notes to 8ths, making arpeggios "straight line" instead of "saw toothed," etc. Occasionally whole new arrangements have to be made because the originals were unplayable at the tempo demanded.

After correcting the parts, actual rehearsals with dancers and singers begin. The company has already rehearsed for weeks with a piano. The sound of the orchestra has to be integrated with their product. In the matter of volume alone, much adjusting has to be done for proper balance with dialog, with patter songs, with choral singing, with tap dancing and for many other reasons. Music must be marked with "Cutoffs" (also called dead stops, grand pauses or luft pausas, and indicated by two nearly vertical lines, thus //), breath marks for singers, dynamics, repeats, D.S. and Coda marks and others. There are usually bad turns to be fixed by copying a few notes or measures at top or bottom of a page to facilitate continuity of playing while turning. Most players send substitutes to theatre jobs for various reasons. Decency dictates that all marks shall be as plain and explicit as possible to enable a sub to do a creditable job at sight. Other musicians sitting nearby help subs by pointing to cues, repeats, D.S.'s and other special marks, and by explaining unusual spots of the show. When there are a few minutes to relax, a sub likes to be

told that he may look at the stage without incurring the wrath of the leader. One of the rules of the pit is "Don't look at the show the first performance."

Manuscript should be marked lightly, in lead pencil only, for easy erasure. Marks can be broad to catch the eye, but put on lightly. All shows start out with too much material. Cuts are made at rehearsal. The favorite method of marking is shown in the article on "Cut" in the Glossary at the back of the book. The curved and diagonal lines catch the eye quickly. Cuts add their own problems to those of page turning and transposition.

Often a part that has been cut is restored to the program. If erasure of the cut marks cannot be done without damaging the notes, the word "Good" is written at the start of the cut passage. Thus used, the usual meaning of the word is not intended. It means instead that the part marked out or cut is now to be played.

Each player adds to his part any explanations that will help him and his substitutes do a better job. A good scheme is to write spoken cues from the stage at the start of musical numbers. It is fairly common for a player to lose his bearings while watching the stage and to start to play again the number that was just finished. The spoken cue is a good preventive for such a tragedy.

The dress rehearsal for a new musical is a hectic ordeal for all concerned. Producer and backers are on edge because of the large investment tied up. The cast is worn down and frayed by the long rehearsals, and often by the frantic last minute changes in dialog and stage business to plug weak spots in the production. These changes can be very trying to musicians as well. There is a limit to the number of times that a piece of manuscript can be altered and still remain legible. Maybe someone thinks the verse of

a song is weak and that the chorus should be done first to give the song a better sendoff. The musicians mark their parts accordingly—Chorus, verse, chorus. The introduction as written fits the verse but does not start the chorus well. So, says the leader, "Start two bars before the first ending to give the singer the pitch." They try it. Four bars are not enough for her to get to the center of the stage. "All right, rub that out and start on the 17th bar of the chorus instead." If it still does not suit the bosses they may try the tune with a different singer, whose voice has a different range. The leader says "Transpose it down a minor third for now to see how it goes." If the new singer makes it click with the production manager the next instruction to the orchestra is "O.K. That's it. A minor third down for now. We will try to get parts for you in the new key before the opening. If there isn't time you'll have to do the best you can with this copy in F. But play it in D major, anyway." And so it goes. Costumes have to be tried out not only for fit but for handling in the scenes in which they occur. Hoop skirts are sometimes too big to go through an exit, and some change must be made. Dancers need to have costumes loosened because they restrict movement. Sometimes a singer finds himself in a strait jacket that he can't sing in, and throat and chest garments are enlarged to suit. Props have to be tried out. Lighting a scene is an intricate matter. Makeups go sour with incorrect overhead light. The delicate shade of a ballroom gown can be lost completely with the wrong light. And all of these things go on at the same time and place. Pandemonium reigns. Heads of departments beg each other for just a few uninterrupted minutes to finish this or that. A soprano has been known to rehearse her big number in competition with two air hammers pounding holes in the concrete floor for seat fas-

teners. When she begged for a few minutes of silence she was told, "Sorry ma'am, we can't stop. If we don't get these seats in for the customers there's no use of you learning your song."

A dress rehearsal is supposed to go through without stop just like a performance, but this rarely happens. Usually there are frequent stops to try other effects or words, or lighting, or an entrance from the opposite side of the stage, etc. Musical introductions are shortened and lengthened to serve their purpose. Sometimes an actor does not have time to make a costume change and the sequence of numbers must be switched to correct the situation. If one act is noticeably weaker than another whole numbers have been changed around to balance. All this takes time, and many a dress rehearsal that started at normal curtain time has not finished until daylight. Often exhaustion stops the scramble, and openings of new shows have to be postponed. To obviate this, many shows have several "previews" before the regular opening. This smoothes the way for the "Big Night" when the news critics and the sophisticates come in droves, often in an attitude of daring the show to entertain them. The previews break the tension and all participants can do their work more naturally than when a show plunges right into the big opening only a few hours after the finish of a long and wearying dress rehearsal that is so broken up that even the actors have difficulty patching together a clear idea of the whole production.

It is traditional that the turmoil of preparation keys up the participants to a nervous tension that carries them safely through the first performance in spite of the fatigue and confusion. It is also accepted as custom that the tension breaks after the grand opening, and the second performance is almost always sloppy. It usually requires four

or five repetitions for the standard of performance to be up to that on opening night. After that the show slides into a groove of efficiency and all performances are nearly alike. Musicians learn the cues, the tricky spots in their parts, and the bad turns in the manuscript, and they settle down to a rather easy existence for the remainder of the run.

When a successful show ends its run and goes on the road, the job confronts the clarinet player who goes along with some new problems. In every town there must be a rehearsal with the local musicians employed to round out the instrumentation with the "key" men travelling with the show. Only a few of the largest shows carry a clarinet, and none of them (except ballet) carry two. So in each town there is a new second clarinet player to be shown the bad turns, the cuts, D. S.'s, codas and all other unusual marks. The quality of local musicians varies greatly. To play safe, the parts of all the travelling players are "loaded" with most of the important items. Flute, bassoon, viola, bass clarinet and many other cues are written in so that melodies or other key bits are not missing at performance. With a good side partner the itinerant clarinetist can save his frequently overburdened lip by resting during occasional measures of incessant work. Occasionally the opposite is true and he will have to play low melodies entrusted to the second man in the music. The rehearsals are deadly —the same music over and over, always with new people. And always in winter the pit is cold and drafty because the big doors backstage have to be open while scenery and props are brought in. It is not unusual to wear full outdoor wardrobe and to blow on the fingers while going through what is often facetiously referred to as "band practice."

Most theatre pits are entirely too small for present day show orchestras. Very few theatres have been built in the

last thirty years. In that time the size of orchestras has more than doubled in many instances. Pits built for twelve or fifteen men now try to hold thirty or more. In cases where they cannot hold so many, men sit in the front rows, in boxes, and under the apron of the stage facing the audience. They are usually so crowded that fiddlers have trouble bowing without hitting their neighbors, or the ceiling under the apron, which is often only five feet above the floor. If a musician cannot sit comfortably and play easily he cannot play well, but few theatre managers will believe it. Some of our largest cities do not have a single theatre that can properly mount a large modern show. At the other extreme, some cities have built giant auditoriums that are too large in every dimension. Microphones and amplifiers are used to step up the voices so they can be heard by all, but the distortion and spoiling of tone quality do more harm than good. The mikes seldom pick up the pit musicians, and balance is lost completely. In many of these gargantuan buildings the orchestra pit is as much too large as every other feature. In case of a sellout, customers frequently sit in the pit close enough to the musicians to hinder them in their work. Wise players take their instruments with them at intermission to remove the temptation to tamper with them.

When a clarinet player travels he should have an emergency repair kit with him for changing pads at least. It is not possible to have good work done on short notice in many cities.

CHAPTER XXXI

CONCERT BAND

THE concert band is a musical anomaly. The only music deliberately written for it, with a few rare exceptions, is the march. The finest band libraries consist of arrangements and adaptations of orchestral music, much of which is ill suited for the instrumentation of bands as we know them. And this instrumentation is inexcusably bad in almost all cases. Great music which is basically suited for band often suffers from inferior adaptation, just as a great book suffers by translation into some other language. The translator does not have the gifts of the original author. The band arranger never has the genius, and seldom even the workmanship, of the great composers.

The band's greatest weakness is the lack of anything to take the place of a complete string section. Clarinets try to do their work, but nobody in this country has used the right number of them for it. A complete symphony string section must have at least ten first violins, eight seconds, eight violas, eight cellos and eight basses. A comparable band reed section would have to have the same numbers—ten solo and first clarinets, eight seconds, eight alto clarinets in place of the violas, eight B♭ bass clarinets for the cellos, and eight contra bass clarinets, some in E♭ and

some in B♭, instead of the string basses. With such a section much of the string work in symphonic music could be played with reasonable success. There has never been such an instrumentation. Some of our large bands have one or two each of alto and bass clarinets, largely for looks. Each is usually given a few notes alone in each concert to satisfy the curiosity of the audience concerning them. But they are so overpowered by weight of numbers that their only real contribution to the musical merits of a program are in a light accompaniment for voice, violin or flute solo. The reed section cannot stand alone, but must rely on tubas for a solid foundation.

Even with a complete reed section as outlined above, there are certain inherent insurmountable difficulties to handicap a band. It is wrong to think that a band can play everything an orchestra can. First there is the need for wind players to stop every few seconds for breath. Then there is the fatigue factor. Players have to rest lips, tongue and throat frequently, especially in the high register. Any change-off method to relieve this fatigue in a section is hard to do evenly. Thin spots will occur. The last two and a half pages of the Tannhauser Overture are solid sixteenth notes in the high register at high speed. No man could ever play them all on a clarinet. It would be a unique accomplishment if two men on one stand could play all of them, between them, in correct time and with good intonation. Because of fatigue there are sure to be places where only a third or a fourth of the section will be playing at one time. Violinists can play incessantly for hours at a stretch. They can play fast, accurately and musically an octave or two higher than clarinets. Many melody lines are spoiled in band because the peaks have to be written an octave lower. Clarinets have trouble playing unisons in tune above high D or E.

In some good bands only the first chair man is allowed to go higher—the rest of the section stays in the lower octave. Violins can be played exactly in tune in either tempered or absolute scale throughout their range. They can also achieve a pianissimo in alt that clarinets can never hope to match. Their staccato is two to four times as fast. All of these difficulties are painfully apparent in the product.

The attempt to imitate an orchestra should be abandoned. Bands would do well to confine their programs to music they can play well, rather than attempt music that is either too difficult, or music which needs the string tone and characteristics which the composer had in mind. To illustrate, the overture to Il Guarany perhaps sounds better and more brilliant in band than in orchestra. Conversely, the Prelude to the first act of Lohengrin should never be attempted. No wind instrument can hope to imitate or take the place of the upper harmonics of the violin. The present-day band sounds best when playing such music as the orchestral suites of Rameau, Bizet, Massenet, Saint-Saens, Delibes, Grieg, Tschaikovsky and others; and heavy bravura passages so abundant in music like the Liszt tone poems. There is a brilliance of tone surpassing that of the orchestra. Marches are undoubtedly at their best in band. Few people can resist tapping their feet when a good band plays a good one.

The first violin parts played by the solo clarinets call for a vast amount of finger speed. It is not enough for a man to be a thorough technician and a fast sight reader. There are just too many notes to wade through. The solo clarinet parts of standard overtures and other band music should be practiced diligently in private before they are encountered on the job. Volumes of these solo clarinet parts are in print and are easily obtainable. Second and third clari-

nets play the second violin and viola parts. These are usually quite playable, except for fast staccato figures and fast tremolo. The desired effect of the latter is approximated, however. Each man tongues as fast as he can. No two have the same speed, resulting in a shimmering effect quite different from a sustained tone. The parts lie in the medium and low registers and are much less fatiguing than the high register of the first clarinet parts.

The first chair solo clarinet is the concert master of a band in the same way and degree as the first violin is the concert master of the orchestra. The other players look to him to start new tempos from the leader's beat. He plays all solo passages for clarinets, many of them alone. Because no other wind instrument has sufficient range and agility, violin cadenzas go to him as well as those written originally for his own instrument. The overture to Orpheus illustrates this. In orchestra the violin plays one cadenza and the clarinet plays the other. In band the clarinet does both. All clarinet parts in orchestra are supposed to be playable. Many violin parts inherited by clarinets in band are decidedly unplayable. Much music must be skimmed over or simplified.

In transcribing music for band, key signatures are frequently changed to sound a half step higher for the purpose of eliminating sharps which would be too much for the clarinets. The lightning fast triplets of 32d notes for the violins which embellish the main theme on the first page of Rienzi Overture are impossible on the B♭ clarinet in the original key. The key is one-half step higher in the band arrangement, and the notes are easily playable by any good performer.

Tonal balance between the sections of a band is on a different basis from orchestral balance, because of the ab-

sence of strings and the much greater weight of the brass. Clarinets inevitably play louder to be heard. This is often not realized on an extended band engagement until the next job with orchestra. A complete overhaul of tone production and especially of volume of tone is usually required.

Vocal soloists seldom have band arrangements for their music. They bring with them their orchestra accompaniments and the band players make the necessary adjustments. Tubas play the string bass parts. Baritones use the cello music. Flutes and trombones get their own parts, which differ little in band and orchestra. The clarinets, the real work-horses of the band, get the violin and viola parts. These must be transposed up one step. Frequently the solo and first clarinets must play an octave lower, either for technical reasons, or to provide a better contrast to the voice, especially if it is soprano. This is not usually done by thinking a seventh lower. That is difficult. Clarinet players good enough to play in the solo section of such a band have little difficulty in changing octaves, up or down. In this case they *think* one step higher. Fingers automatically play the octave below.

A famous anecdote in this connection concerns an occurrence of some years ago. One of the best known concert bands had a new solo clarinet. There was no rehearsal to start the season. The band assembled from all directions and started the first concert "cold." The leader was a showman and allowed barely enough time between numbers for page turning. The soprano soloist walked on and bowed while the preceding march was still reverberating through the hall. Then came the down beat—and pandemonium. There was no doubt about it, the band was playing in two different keys. The new man was not at all panicky, and started at once to take charge of the reed

section in the only way possible. He played loudly and incisively and literally brow beat the other clarinets into the same key he was playing in. The rest of the band was high, but not for long. The other sections sensed the trend, and before the introduction was finished even the tubas had given in and were playing in the lower key. With a shrug the soprano sailed into her number and all was harmonious to the end. At the finish, when the applause commenced, the solo clarinet glanced at the top of the page and nearly fainted when he saw it was a violin part that he should have transposed one step higher than written. He was so overwhelmed with chagrin that he could hardly continue playing. He thought he could see himself that evening on the train going back home—fired. When it was over, the leader disappeared into his dressing room without saying a word. In a way this was worse than a nasty harangue. It left no outlet for his own resentment toward himself. Slowly he wiped out his instrument and prepared to leave the theatre, when a second cornet player, who had had no part to play during the song, came up and complimented him on his superb job of rescuing the solo by leading his colleagues out of the musical wilderness into which they had plunged. The culprit thought it was being rubbed in, but finally he realized that the man was in earnest. He really thought he was the savior instead of being the instigator of the trouble. The solo man softly whistled and said to himself, "It isn't what you do, but what you can make them think you do, that counts."

CHAPTER XXXII

VARIOUS KINDS OF ORCHESTRAL PLAYING

Symphony Orchestra

THE goal of most clarinet students is to play in an organized symphony orchestra with an established season, for musical and financial reasons. Here are put to use all of the tricks of the trade, and the artistry of the product is limited only by the ability and zeal of the players. The repertoire is unlimited—the product of centuries of the world's great geniuses. In the main these men knew the possibilities and limitations of instruments, and all parts are playable. The development of the clarinet was so recent that much early music is uninteresting to the player. It had to be simple for the crude instrument in use when the composer lived, and has therefore very little for the modern player to "sink his teeth in." The early symphonies of Beethoven are good illustrations. It is quite probable that he never heard a really good clarinet player, and learned of the capabilities of the instrument in later years only by seeing scores of his contemporaries. Other composers were quick to learn what it could do and they promptly put it to work.

The wood-wind section plays together much of the time. With the same personnel year after year teamwork is developed. Players learn the faulty notes of the instruments in their section and how to compensate for them. They learn how to keep dynamics in the proper range for chord balance. Breathing and phrasing are done together. The returns in musical pleasure and self esteem are infinite.

Opera

In some ways opera is the most difficult of all. No matter how competent a player is he must know in advance the opera he is to play, and that does not mean knowing just the clarinet part. In these days of paid rehearsals it is increasingly difficult for even a fine player to take his place in a good opera orchestra, especially as first clarinet. Lucky is the man who can play second for a few seasons with the opportunity to hear the tempos and to become familiar with the music, the dead stops, and the tricky cues. Even then it is an ordeal to move up to first clarinet. In general, opera does not require the playing finesse which is the essence of the symphony for two main reasons. In the first place the orchestra is subordinate in interest to the stage for most of the audience—they watch the stage and listen to the singers. They listen secondarily to the orchestra. Second; the voices actually compete with, and dilute, the volume of sound. But if opera requires less finesse, it demands more alertness and flexibility to cope with balky scenery and props and with singers whose memories sometimes play tricks. When anything goes wrong on the stage the pit orchestra must always manage somehow to skip a few notes or measures, or double back on its tracks to com-

pensate and cover up. Only routined opera players can do it musically without letting the audience in on the secret that something is wrong.

Chamber Music

Chamber music is frequently called the highest art form in music. The repertoire which uses clarinet is limited to perhaps thirty major works. They should be "under the fingers" of every good player, though the chances to play them in public do not occur often.

Chamber music is written for a certain number of instruments in the composer's mind. Doubling and substitution are not possible. The number of instruments can be two or more. Each note for each instrument is a solo, in the sense that it is noticeable if omitted. The slightest mistake is audible. Virtuosity and teamwork are equally important. Each man needs to know all the parts played by the others in order to fit his own in without the "seams" showing. This is largely because there is no leader to beat time as in orchestra. In rehearsal it is customary for the man with the melody to tap his foot if there is any question of the tempo, but visual help is missing. There is great satisfaction in playing fine chamber music with first class performers.

Jazz

Jazz playing—as distinct from jazz composition—is merely a distinctive style, a variation of orthodox playing. It can be likened to the pronunciation of a language different from that prescribed by the dictionary. As it concerns

the clarinet, it depends upon the same basic controls of the instrument. All of the really good jazz players went through the standard curriculum to build the three pillars of playing—tone, staccato, finger technic. They learned to play "straight" or "long haired" clarinet first. Jazz is really the superimposing of an acquired style upon the basic principles of regular clarinet playing. Finger technic is identical except for occasional delayed action transitions to produce the familiar glissando. Staccato is the same. Only in tone production, and especially in vibrato, is there any radical departure from ordinary methods of playing. All reference to tone up to this point has emphasized a straight steady tone "as smooth as a ribbon." Jazz seems to demand a vibrato. As to method, it is variously produced by muscular effort in lips, jaw, throat or in forcing the air from the lungs. A fast or slow rate of vibrato, as well as a wide or narrow deviation from the true pitch, differs with individuals. It is a matter of taste. It is easy to alter these two characteristics for uniformity in a reed section of any group.

Most jazz players use a wider open, and frequently longer mouthpiece lay than straight players. This gives more flexibility of tone quality, and of pitch for glissando. With relaxed lips the familiar "howl" in comedy bits is more easily possible than on an ordinary medium close French facing.

GLOSSARY

Terms and Symbols Used in the Practical Music Business

Ad lib: Loosely translated it means "as you wish" or as a soloist or leader wishes. Frequently used on music to denote interruption of the regular time to accommodate stage "business," or unusual interpretation by a soloist.

Accidental: A flat, double flat, sharp, double sharp or natural sign used anywhere in a composition to change the note following, and all similar notes and their octaves in the remainder of the measure in which it occurs. (See signature.)

Allo breve (¢): Common or 4/4 time which is "doubled up" and played two beats per measure, with the half note equal to one full beat. Often called *cut time.*

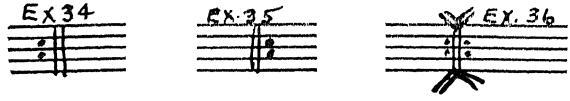
Arpeggio: The three or more notes of a chord sounded one after the other. Being a long and awkward word, wind players use it infrequently. Following their custom, in this book the word "chord" in relation to clarinet technic means arpeggio.

Arrow: When clarinet parts are "scored double" (two staves bracketed together, the upper for first clarinet and the lower staff for second) it is sometimes desirable to have both men play the same line to reinforce a weak "voice" in the arrangement; or to have the second man play a few measures of the first part to allow the first man to rest his lip after a long, tiring passage. To accomplish this an arrow is marked diagonally on the page between the two staves, showing which man

is to change to the other staff and at which exact spot. Manuscript copyists frequently use this device to save labor when the two parts were originally intended to be identical for a few measures. They then draw a wavy line along the center of the empty staff.

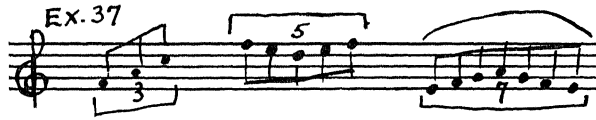
"As one": For ballroom or stage dancing it is often necessary to connect parts of several musical numbers to form one continuous number with no break in the time. These sections are labelled "2 as one," "3 as one," etc. The word "segue" is used for less closely knit sections. (See Segue.)

Bar line, or Bar: A vertical line connecting the five lines of the staff which designates the completion of one full measure of time as announced in the time signature at the start of the composition or of that particular unit of it. A double bar usually denotes the end of one musical thought or phrase. A double bar preceded by dots on the 2d and 3d spaces of the staff, is a *repeat sign.* See Ex. 34. It sends the player back to the last double bar which has two dots *after* it, Ex. 35. In manuscript it is the custom to add brackets to a repeat sign to catch the eye more easily, as in Ex. 36.



Bracket: A right angle bracket (with the horizontal line opposite the stems of the notes included) is used to indicate a triplet in duple time, an even-numbered group of notes in triple time, or any other number of notes in a group which are not in the time scheme announced in the signature at the start of the piece. The figure in the bracket indicates the number of notes to be played

in any one beat or in a specified fraction of a beat. If in doubt as to whether three notes or five notes (as in Ex. 37), or any other unusual number of notes grouped under a bracket and number, should be played in the time ordinarily allotted to two eighth notes, or to two quarter notes, or to two half notes, etc., the other notes and rests in the measure can be added up. The difference between their total value and the value of a whole measure is the amount of time, in terms of beats, that is intended for the bracketed group. This square bracket must not be confused with the sign for a slur, which is always curved. Bracketed notes are to be played staccato unless they are also marked slurred, as shown by the group of seven notes in Ex. 37.



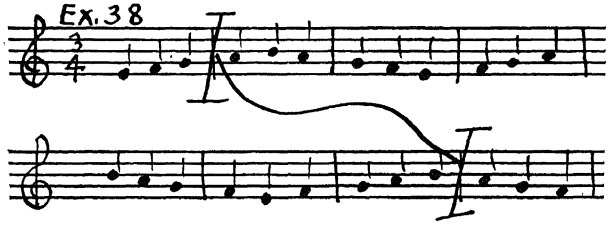
Chord: Three or more notes that sound well together.

Circle: When a circle is drawn around one or more notes it means that they are not to be played but that their full time must be allowed for a rest. The effect is the same as if marked "tacet," but the word occupies so much space on the page that it is difficult to designate the exact spot it is meant for, if only one or two notes are affected. The circle is drawn accurately around the desired note or notes. Notes should never be blotted out by ink or pencil. Blotted out passages are cuts—eliminated from the time scheme.

Coll Primo, or Coll 1°: Literally "with the first." Usually indicates that the second man is to play the first clarinet part with his partner.

Coll (or Colla) Voce: "With the voice." Phrase and breathe with the singer, and be careful to observe time irregularities in the same way.

Cut: Any music not wanted is "cut" by means of two brackets and a connecting line. The upright line of the brackets should be diagonal and the connecting line curved so the eye can easily detect that it is something apart from the vertical and horizontal lines of the actual music, thus:

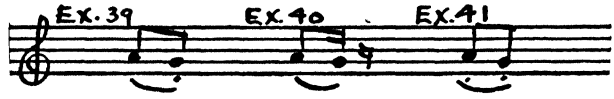


In concert band, and sometimes in pop orchestras, cuts are made in several places in long operatic selections, and similarly loose-jointed compositions, for the purpose of timing to fit all emergencies. Some leaders mark cuts in different colored crayon. When pressed for time at a concert the word is passed around among the players "Make the red cuts" or the blue ones, or the red and the black ones, or whichever ones will save the required amount of time.

Dal Segno (D. S.) and 𝄋: Italian, meaning "to the sign." Actually we use it only to go *back* to the sign, which is frequently called the dollar sign. This procedure is used to save the labor and expense of copying or engraving the same passage the second time. After going back to the dollar sign the player again plays until he encounters the Coda Sign 𝄌 (often called cart wheel) and then jumps to the Coda, which is also marked with

a "cart wheel." Occasionally a "manuscribbler" will employ two of the dollar signs instead of the letters D. S. and one sign. This is confusing. The player is tempted to look backward from the first one, instead of playing to the second and going back to the first.

Dot under a slur: A dot placed over or under a note (opposite the stem) is a command to shorten it. Since all notes must start at the indicated time, the dot robs them at the end, of an amount of time that cannot be exactly computed or indicated. Good taste alone dictates how much (see page 66). Many players execute wrongly groups of two slurred notes, only the second of which is dotted.



In Ex. 39 the note G is not to be tongued, but merely ended before it has been given its full value. Actually the two notes must be played approximately as if they had been written as in Ex. 40. For the second note to be started with the tongue, the first note also must be dotted, as in Ex. 41.

Encore: In musical shows encores are seldom as long as the number itself. The word "Encore" is written at the nearest possible point on the staff where it is to begin, and a line or arrow marks the exact note. If a certain number is seldom encored, it is customary to mark the spot with two words "If Encore." This prevents players scrambling to turn back the music for an encore that is not forthcoming, when they should be looking ahead for the start of the next number. The prolonged applause that causes an infrequent encore provides plenty of time for turning back music to the starting point.

"Good": If cut passages have been marked too heavily for good erasure when music is restored to the program, the word "Good" is written just above it to indicate it is to be played.

"Ink Only": Play the composition as originally printed. Leaders often use this expression when a piece has been so badly marked by pencil for repeats, cuts, transpositions, etc., that erasure is impossible.

"In 3," "In 4," etc.: 3 beats per measure, 4 beats per measure, etc.

Interval: The distance between two notes. Two notes a half step apart (as B to C) are separated by the interval of a *minor second.* A major second is one whole step, as C up to D. A minor 3d is 1½ steps; major 3d—2 steps; perfect 4th—2½ steps; augmented 4th or diminished 5th (see any book on harmony)—3 steps; perfect 5th—3½ steps; augmented 5th or minor 6th—4 steps; major 6th—4½ steps; minor 7th—5 steps; major 7th—5½ steps; octave—6 full steps. Intervals are reckoned inclusively, i.e., D up to F is a third because three notes are involved, D, E and F, although they are only 1½ steps apart.

Intonation: The "state of being in tune" with your neighbors. Intonation can range from terrible to excellent, but never perfect because of the tempered scale we use.

Measure: The amount of music between two adjacent bar lines. In actual music work the word "bar" is often substituted because of its brevity. In rehearsal a leader will say "Start three bars before letter M" when he means three measures before letter M. "Start in the middle of the bar" is a common but more far-fetched use of the word.

"On the nose": Usually means to start on the first beat indicated. It is also used to denote correct pitch or intonation, and in radio stations it is used to indicate that the timing of a program is working out correctly. If the program director touches his forefinger to his nose and looks at the musical director it is the same as telling him that the timing is satisfactory and that he is to continue playing at the same speed to the end of the number or of the program.

"Pick it up": Play the pickup note just ahead of the leader's first beat. He will not make any special motion for it. The opposite of "Full measure" or "A beat for nothing," necessary when several pickup notes would cause a ragged start without some means of setting the tempo in advance for them.

Segue: It means to go ahead, usually to the next number, with almost no loss of time, but with a definite break in the rhythm. "Quick segue" is often used when one piece of music is interrupted before the finish and another one started immediately,—a common occurrence in shows, to match stage action. "Slow segue" is written on parts when time is allowed for applause, or for a line or two of dialog, etc. Such instructions help players in deciding the best time for page turning to a new number.

Signature: Key signature is composed of flats or sharps at the start of a piece of music denoting which notes are to be altered throughout, as distinct from accidentals which occur from time to time and which are effective only in the measure in which they are placed. Time signature consists of the numbers such as 2/4 or 3/4 to indicate how many of what kind of note, or their equivalent, are to be found in a measure of the ensuing music.

Slur: A curved line connecting any number of notes which are to be played with a continuous tone. Only the first note of a slurred group is to be attacked (tongued). Repeated notes under a slur must be separated by attacking the second one unless the two are joined by an additional or Double Slur.

"Solo": This word on a clarinet part in orchestra means just what it says, although it is not necessarily the melody. It may be a note necessary to a chord which nobody else has. Placing the word there is a warning to the player that the note is essential and that he must not omit it for the purpose of turning the page, or blowing the water out of a side hole, or any other reason. In concert band, the word "Solo" on a passage means that only one man on the stand is to play it, and in a large reed section it usually means that only the first chair solo man is to play it.

Spring, of a reed: The part on the round side that has been cut to make the taper.

Tacet or tacit: Parts so marked are not to be played, but the time is counted.

Technic: Used generally to indicate the amount of speed possessed by a player, in contrast to "technique" which refers to the manner of doing something. This latter word is little used in clarinet parlance.

Vamp: An interlude between the introduction and verse of a song, usually consisting of one, two or four measures of music invariably ending on the dominant seventh chord. It is repeated "ad lib" (as many times as nec-

essary) to enable the singer to reach the center of the stage from the wings, or to allow for applause, or for comedy "business" by the performer before he chooses to sing. In this case the command is "Vamp till voice."

V. S.: Volti Subito—"Turn Quickly." Found most often at the bottom of a page to indicate that there is more music on the other side. Without this warning the player might rightfully assume that the piece was ended.